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JANUARY, 1929

INSTITUTED 1847

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CONTENTS

ANNUAL GRADUATE FORTNIGHT. THE PROBLEM OF AGING AND OF OLD AGE, October 1 to 14, 1928 1

Relation of Endocrine Disorders to Senescence, William Engelbach 1

Arterial Diseases of the Brain and Cord, Foster Kennedy 19

Menopausal and Post-Menopausal Conditions in Women, Benjamin P. Watson 25

Urology, its Contacts with General Medicine, Joseph F. McCarthy 38

Arthritis and Old Age, Russell L. Cecil 52

Traumatic Surgery and the Problems of Age, John J. Moorhead 66

Diseases of the Eye in Old Age, William H. Wilmer 76

Special Aspects of Neoplasms in the Aged, James Ewing 104

X-Ray and Radium in the Problem of Old Age, Francis Carter Wood 105

Hypertension, Herman O. Mosenthal 107

Angina Pectoris, Harlow Brooks 108

Senescence and Rejuvenescence from a Biological Standpoint, Charles M. Child 111

Liver and Biliary Passages, Franklin W. White 113

Digestive Problems, Thomas R. Brown 117

The Library

Catalogue of an Exhibition of Books, Etc., on Old Age 119

Recent Accessions 135

Proceedings of Academy Meetings 138

Notes

Dates of Academy Meetings 143

Luncheon Announcement 143

Donations to the Library Funds 143

Death Notice 144

Index 144

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ANNUAL GRADUATE FORTNIGHT

The Problem of Aging and of Old Age

October 1 to 14, 1928

RELATION OF ENDOCRINE DISORDERS TO SENESCENCE [1]

WILLIAM ENGELBACH

Engelbach Clinic, St. Louis

Life Duration and Expectancy of the Endocrinopathies. Endocrine Senility. Relation of Endocrine Diseases to Other Conditions Producing Senescence. Early Diagnosis. Preventive Endocrine Therapy.

Physiology is that part of biology pertaining to the processes, activities and phenomena of living organisms. Modern conception of physiology concerns the phenomena produced by the various bodily activities. These activities are biochemic effects resulting from alterations in food-stuffs from intake to expulsion. The three primary physiological phases which deal directly with normal growth and development refer to those correlated functions performed by (I) the organs of *secretion*, (II) the organs of *incretion* and (III) the organs of *excretion*. The secretory organs in this sense are limited to the gastro-intestinal tract and its adnexa. These organs supply *secretions* through tubules. They have as their functional objective the reduction of complex food-stuffs to elemental, utilizable substances. These utilizable substances are absorbed from the gastro-intestinal tract to be used immediately or to be stored as reserve. The incretory organs, or en-

[1] Delivered October 4, 1928.

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docrine glands are ductless, and consequently furnish directly to the blood their *internal secretions*, or *incretions*. These incretions convert the utilizable substances (prepared by the secretions), into some form of energy for general use or specialized cellular activity. The conversion of stored glycogen into energy in the form of muscular contraction is a simple example of the function of the endocrine glands. Insulin has for one of its purposes the *mobilization* of glycogen in the liver. Through this function, if normal, the blood sugar is evenly maintained at from 0.10 to 0.12 per cent. Adrenaline has among its many functions vasomotor constriction and *demobilization* of the stored glycogen. When demanded for consumption, adrenaline liberates from the liver into the blood an excess amount of glycogen. Through visceral vascular constriction this hyperglycemic blood is rushed to the muscles. There with other utilizable principles the glycogen, through the biochemic cell activity of other incretions is transformed into specialized energy, muscular contraction, and energy for general use, in the form of heat. The third primary physiological phase has as its end-result the *excretions*. This process consists in the collection by the blood of the tissue waste-products (resulting from the incretory act), their transference to the excretory organs for separation from the blood and their ultimate expulsion from the body. Cellular function of *other systems* of the body are intimately interwoven and coordinated with those effecting the processes of *secretion*, *incretion* and *excretion*.

The second phase of this triad of physiological processes, that referable to the function of the incretory organs, is the most vital and essential. Contrast the specialized attainments of the *conversion of inert, basic substances into energized physical and psychic activity*, with the simpler chemical processes of the *preparation* of utilizable substances and the *elimination* of waste products. Endocrinology, the study of the *incretions*, for this reason *is* the application of the essential fundamentals of the most vital phase of physiology. The endocrine system is the keystone of the completed physiological arch builded by this func-

tional triad. The biological effects of the *internal secretions* are the peak of this physiological phase.

Incretory function, however, is not limited merely to the act of converting utilizable substances into energy. The endocrine glands not only sustain the two allied functional mechanisms of this triad, but by unison of incretory action afford *generalized energy* for the *protection* of the *bodily harmonies* and through *specialized cellular activity* maintain specific functions of *all other systems.* With the aid of the autonomic nervous system their hormonic interaction almost independently regulates their own functions. The individual glands of the *secretory* organs are dependent upon the chemical messengers of the ductless glands for *their* activity. For instance, the internal secretions have a decided influence upon the motility, as well as upon the activating enzymes and chemical secretions, of the gastro-intestinal tract. In turn, the involuntary processes of the organs of *excretion* rely almost wholly upon incretory function. A gross example of the production of energy for generalized usage is their creation of heat as a protection against thermogenic changes or mechanical injury. Bodily temperature reaction to the invasion of bacteria or toxins is an evidence of the role of the endocrine glands in the production of immunity. Involuntary muscular action (cardiac, respiratory, intestinal) is normally provided by them. Specialized energy, resulting from specific cell activity, relates the function of the endocrine organs to other vital systems of the body, such as the nervous, cardiovascular and reproductive. These depend upon the internal secretions for their individual cellular activity, the correlation of which is necessary for the projection of the functional objectives of their entire systems. Incretory relation to the central nervous system governing voluntary acts is well demonstrated by voluntary muscle tonus. Musculo-osseous overgrowth and muscular *strength* of gigantism accompany *hyperactivity* of the anterior lobe of the hypophysis. When, however, this lobe manifests a transition from *hyper-* to *hypoactivity,* general muscular weakness is so extreme as to make

it difficult for the patient to stand alone or, in some instances, to raise his arm. In this condition, although normal volition demands contraction of the voluntary muscles under its control, there is a lack of response to the higher centers of the central nervous system. Muscular, as well as mental exhaustion is a common symptom of all endocrine deficiency, hence the generic term *"endocrinasthenia."* Absence of anatomic development of the central nervous system has been found in those individuals who have had embryonically a hypoplasia of the cortex of the suprarenal gland. Myxedema depicts abeyance of the mental activities of the central nervous system *after* it has functioned *normally* for many years. On the other hand, the endocrine system is under the domination of the central nervous system. The correlation and interdependence of these two, as well as their interdependence with other systems, is consistent with accepted knowledge of endocrine effect upon all cellular activity. Without the central nervous system, endocrine activity could not be performed, yet its involuntary acts of motility and secretion continue during sleep and coma. The continuance of these involuntary activities for a considerable time, even after all faculties contingent upon the central nervous system have ceased, is probably due to interaction of the hormones which automatically provide for the functions of their own glandular system.

No brief is necessary for the far-reaching physiological role which the internal secretions fulfill. Yet it is true that science must bridge many open gaps of hormone action. Clinical and morphologic studies of endocrine disorders, aided by investigation of the allied medical sciences have advanced their biochemic problems far beyond the realm of speculation and empiricism to a scientific basis of fact and practical clinical application. Modern physiology has dignified the scope of glandular activities to a wider concept than that affecting the thyroid and gonads. Easily obtainable, lucid information clearly indicates their pathogenic relations to premature senility. Physical and mental development consistent with the age of the in-

dividual, is dependent largely upon the harmonious action of the entire endocrine system. This state of endocrine activity produces a delicately balanced perfect equilibrium of the internal secretions. Abnormalities of incretory function create individuals disproportionately precocious, premature or retarded for their age. This may be due to uniglandular or pluriglandular disorders of over- or under-function. Marked variation in any direction, inconsistent with normal development for the age is effective, directly or indirectly, in modifying the life duration and expectancy. A modification of metabolism as induced by these factors, is not only responsible for transient abnormalities, but also affects longevity. In addition to the relationship of glandular disorders to presenility and senescence, *what is most significant is* that they are responsible for more incompetency and delinquency than are chronic diseases of other systems.

The purport of this paper is to emphasize *early diagnosis* and *preventive treatment* in endocrine disorders as means of averting presenility. The basis for such discussion has been the exhaustive clinical study of over 6,000 endocrinisms, many of whom have been observed over a course of eight to ten years. It is necessary here to define what is considered a pure endocrinism. This is one in which, first, non-endocrinous diseases are excluded; and, secondly, positive endocrine disorder, sufficient to account for the symptomatology, is included.

With the exception of Addison's disease and malignancies (hypernephroma, primary carcinoma and sarcoma, endothelioma), the mortality in disease due *primarily* to incretory disorder is exceedingly low. The theory that death in many infections (such as pneumonia and diphtheria), as well as in intoxications (chloroform, cocain), is due to acute endocrine deficiency, is not accepted; consequently, does not alter the following deductions. The lessened span of life of the endocrinopath is usually due either to reduced immunity to extrinsic diseases, or to marked changes in other systems, predisposing to degenerative lesions of premature old age. In general,

it may be stated that the life expectancy is very much longer than in chronic disease of the nervous, cardiovascular or respiratory system. In non-malignant endocrinisms, therefore, the prognosis is usually good with regard to duration, but in those occurring in later decades of life, in which a number of glands become involved, the average expectancy does not equal that of the non-endocrinous individual.

There is considerable misconception in the medical mind regarding the curability and, more important, the preventability of many of the well-known endocrine disorders. A review of therapeutic results in 1,000 endocrinopaths who had been under observation for more than five years proved contrary to contemporary estimation. Good results, defined as a complete relief of symptoms, with restoration of normal capacity, were obtained in nearly 35 per cent. of cases. Bearing in mind that comparatively few were diagnosed within five years of onset, that many had a biglandular or a pluriglandular disorder at first observation and that nearly all were beyond the age of twenty (most of them beyond thirty), these results compare favorably with those in chronic diseases of other systems. The curability of these disorders, however, depends upon a number of factors: (1) The age of the patient; (2) the number of endocrine glands involved; (3) the state of activity of the gland, or glands; (4) the duration of the disorder; (5) the specificity of medical or surgical treatment; and (6) secondary or additional involvement of other organs or systems.

Morbidity due to ductless glandular disorder causes more human distress and economic waste than do other chronic systemic diseases. The limitless number of psychopaths and of backward or feeble-minded children originating primarily in endocrine disorder, is appalling. The untold amount of physical or mental defectiveness and delinquency from incretory imbalance, if actually known, would startle the imagination. Deductions are not to be drawn that all defectiveness is of endocrine origin. That a considerable amount *is*, and of this, probably 50 per cent.

could have been prevented, is a point of alluring interest. The astonishing number of human beings partially incapacitated or reduced to a state of incompetency and dependency upon family or state, measures the amount of actual economic waste entailed by these endocrine disorders. The effort presented in the field of preventive medicine to forestall *juvenile* defectiveness and incompetency is much more important than preventing the premature senility of midlife. Incomparably, this should be a more effective means of retaining juvenility than is offered by the strenuous attempts at rejuvenescence.

Glandular Activity. The rapidity with which functional endocrine disorders *advance* age depends upon the type of activity of the disordered gland. The thyroid, whose activity can be precisely measured by the basal metabolism, offers the most obvious example of retardation or prematuration of normal activities through endocrine influence. Thyrotoxicosis, with its stimulation of cellular activity in all systems, including the endocrine, if severe and unchecked even for a comparatively short duration, produces irremediable damage, particularly to the cardiovascular system. Thyroid deficiency, on the contrary, with its concomitant lowering of basal metabolism, is less acute and more prolonged in course. Owing to its inhibition of the cardiovascular and nervous systems, myxedema is characterized by a disability resulting from retarded mental processes. Acquired myxedema during juvenility results in a classical presenility before the age of twenty. Early aging as induced by other ductless glands whose functions cannot be measured so accurately as that of the thyroid, is reflected largely in signs and symptoms referable to other systems. Preadolescent deficiency of the *posterior* lobe of the hypophysis exhibits a juvenile adiposity. This obesity, if untreated, continues into adult life, when the thyroid gland usually becomes secondarily inactive. This biglandular disorder produces the enormous, frequently unrelievable obesity characteristic of concurrent inactivity of both these glands. In addition to causing a physical debility,

this adiposity unnecessarily taxes the cardiovascular competency.

Marked disorder, either hypo- or hyperactivity, of the *anterior lobe* of the pituitary gland affects principally the osseous and genital development. Except in acromegaly and gigantism, this glandular imbalance causing deforming osseous changes has relatively little influence upon longevity. The secondary gonadal disorder materially affects the marital relation, involving the menstrual epoch and procreative function. Anterior lobe pituitary disorders, either directly or through the medium of the gonads, are productive of extreme psychopathic complexes. These may be so severe as to be mistaken for primary psychoses. Primary genital hypofunction psychically affects the two sexes differently. In the male, *the psychic reaction*, related to general incompetency more than to longevity, is the most distressing manifestation. After adolescence, the absence of sexual characters in the male, associated with extreme shyness and a want of initiative and projection, tends to dissociate the subject from the ordinary activities of life. In the female, the undeveloped primary and secondary sexual characters is not so decided a handicap. In some instances, it apparently acts to the contrary, producing the "masculine female," a competitor of male workers in many occupations. This aggressiveness is pertinent provided the secondary reactions, gastro-intestinal, cardiovascular and nervous (in their sequence of occurrence), are not incapacitating. In early female hypogonadism, the gastro-enteric symptoms are often so severe that, in a group of 200 cases (eunuchoids as well as castrates), more than fifty had undergone at least one abdominal operation for suspect primary gastro-intestinal lesion. Some of these had submitted, without relief, to as many as six abdominal operations. Intractable vomiting had persisted in some intances for a duration of five to fourteen years. The cardiovascular manifestations of this group are tachycardia, vasomotor flushing, palpitation and the complex designated as *"neurocirculatory asthenia."* The nervous symptoms ordinarily are diagnosed as "neurotic," "neurasthenic."

"psychoneurotic," etc. It is to be noted that in this class sensory disturbances involve the mucous membranes of the gastro-intestinal tract and bladder as much as the integument. Involuntary muscle action, particularly gastro-intestinal and respiratory, is affected. A decreased gastro-intestinal motility and modifications in secretion, in conjunction with the abnormal visceral position in the enteroptotic abdomen, undoubtedly account for the gastro-enteric symptoms. Sighing respiration, sometimes even an objective dyspnea, and marked susceptibility of the respiratory tract to chronic infections, as tuberculosis, are among the respiratory symptoms. Hypogonadism has regional and dermal signs inconsistent with the age. The youthful, childlike facies of the ateliotic woman of postadult age is significant. An early soft, velvety, and later parchment-like, wrinkled skin is characteristic of hypogonadism. The aging process due to arteriosclerosis and secondary infection, gangrene, etc., in diabetes mellitus is well known, as is its relation to adiposity, with the consequent cardiovascular strain.

Hypergenitalism is a sign of primary disorder of some endocrine gland *other* than the gonads, most probably the suprarenal cortex or the epiphysis. These cases group themselves clinically into (1) those associated with hypertrichosis (supposedly related to suprarenal cortex function), and (2) those without a preadolescent trichosis or an increased postadolescent hair growth (possibly pineal in origin). Both these varieties of pubertas precox exhibit a macrogenitosomia. In both sexes, sometimes natal, always prepuberal, there is a precocious anatomical and functional genital development. Sooner or later in both sexes, definite symptoms referable to the nervous system develop. These vary from mild functional nervous disturbances to epilepsy and apparent true psychoses, simulating dementia precox. This disorder furnishes a most striking example of endocrine imbalance causing a projection of genital development many years in advance of other systems. The overspecialization of the genital system consequent to this incretory

disorder contrasts with the mental defects of the nervous system.

Early signs of endocrine aging appear in the skin, mucous membranes and retina. Those of the skin refer to its texture, pigment and appendages, the hair and nails. Variation from a soft, velvety dermal texture to a parchment-like atrophy in the hypogonads, and the hypertrophy and subdermal infiltration in myxedemas, have been mentioned. Chronic eczemas and dermatitis, with a persistent, intolerable pruritus, are common in hypothyroidism. Urticarias, erythemas, hyperesthetic rhinitis, hay-fever and asthma, if endocrinous, are most likely related to calcium deficiency of the parathyroid group. The work of P. E. Smith, B. M. Allen and W. J. Atwell has definitely associated an isolated overdeposition of pigment (chloasma) and a complete absence of pigment (vitiligo) with the hypophysis. Retinitis pigmentosa and albinism may have this source. Characteristic abnormal hair growth distributions are principally associated with gonadal and suprarenal cortex disorders. Localized marginal scalp alopecia is usually the accompaniment of thyroid deficiency. Early vertex alopecia so frequently occurs in pituitary deficiency, with relief by substitution of pituitary hormone, that this etiology should be suspected. Generalized atrichosis most often results from pluriglandular deficiency. Two of five cases who had had a total absence of hair for over a year experienced a restoration of hair growth without treatment, indicating that the prognosis in generalized atrichosis is more favorable than in localized alopecia.

Endocrine disorder affecting calcium metabolism has a direct relationship to lesions of other systems associated with senilism. The incretions definitely known to influence *calcium metabolism* are those of the parathyroid and thyroid glands. Calcium derived from food is stored almost exclusively in the bones. The illuminating work of Joseph C. Aub has demonstrated that the storage, mobilization and excretion of calcium is dependent primarily upon parathyroid function, and secondarily upon the thyroid

and probably other hormones. It was also shown that ammonium salts help to sustain the calcium balance in those who are inclined to calcium deficiency. It is interesting to note from his work that in tetany comparatively little relation exists between the *blood calcium* curve and *calcium balance* (the difference between intake and output of calcium). With this interpretation, nearly all deductions based upon the *blood calcium* must be modified. Among calcium deficiency diseases of the younger ages are the spasmophilias, of which infantile tetany, laryngospasm, spasmodic croup, asthma, convulsive and epileptiform attacks are types. In the adult also, calcium metabolism is a factor in various forms of tetany, parathyroid, gastric and intestinal. Vasomotor disturbances and other dermal diseases, particularly urticaria and erythema, are frequently accompanying signs of calcium deficiency. To this etiology has been credited chronic ulceration of the stomach and leg, as well as a definite relationship to the "acid base balance" in acute diseases terminating in "acidosis" or "alkalosis." Its direct connection with early senility is due to calcium deposit in various degenerative lesions of other systems. Atheroma, arteriosclerosis, otosclerosis, chronic arthritis and divers other retrograde changes occurring in midlife have various states of calcification as a part of their histopathology. The immunity and curability presented in the calcification of chronic lesions, as in tuberculosis of the lymph glands and lungs, offer a virgin field for further incretory investigation concerning calcium metabolism in the general subject of immunity.

Important secondary conditions due to endocrine disorder predisposing to early senility have been mentioned in their various glandular relationships. Of special note are abnormalities in *blood pressure* having no *cardiovasculorenal* basis. In a review of 500 uncomplicated endocrine disorders (1920), having no other cardiovasculorenal manifestations, it was found that 10 per cent. had shown a systolic hypertension of 160, or higher. More significant than endocrine *hyper*tension is a *hypo*tension, often 20 to

30 mm. below the normal reading for the age. This *hypotension* occurs in approximately 25 to 30 per cent. of endocrine disorders. Both hyper- and hypotension are related to endocrine *imbalance,* rather than to a disorder of any gland or combination of glands, or a single state of glandular activity. In general, abnormal blood pressure changes having no pathological basis are probably endocrinous. It is probable that the large majority of so-called *essential hypertensions* are due to incretory imbalance. The present inclination to attribute this type of hypertension to heredity is probably not far-fetched. Knowing the tremendous influence of heredity upon constitutionality through endocrine transmission, we may concede that its studies *do* help to explain many of these vascular hypertensions. Here again, emphasis must be placed upon early diagnosis, to prevent the propagation of just such untoward inherent tendencies by opportune correction of their incretory cause.

Early Diagnosis. The treatment of premature senility should be *preventive. This is dependent upon early diagnosis.* As heredity is the prime etiological factor pertaining to ductless glandular imbalance, the removal of this predisposing influence should be given utmost attention. The probability of modifying its influence in many endocrine disorders presents a fruitful and productive field in preventive medicine. For this reason, it is necessary to make a searching study into the genealogy. Investigation relative to endocrine syndromes should apply to the parental and ancestral history, and the clinical indices to endocrinism should be sought in the gravid woman, the infant at birth and during the infantile, juvenile and adolescent ages. After conception, the gravid woman should be observed closely for failure of endocrine response to the additional demands of pregnancy. Functional response of the thyroid after the second month of pregnancy, we believe, can be definitely measured by serial monthly basal metabolic tests. Following the second month, the basal metabolic rate should be above normal, ranging from +15 to +25 per cent. In gravid women in whom this

increased rate does not prevail, the thyroid is considered as *not* furnishing to the mother or embryo sufficient thyroxin to provide for the mother's increased endocrine demands or to supply a normal fetal metabolism and development. Other clinical evidences of thyroid disorder during gestation are a diffuse enlargement of the gland, facial puffiness, supraclavicular and dorsal padding and toxemic symptoms of pregnancy (nervousness, nausea and vomiting, albuminuria, abnormal blood pressure, etc.). The effect of a lowered metabolism upon the fetus is an increase in size, producing overweight at birth, which is a danger during delivery to both mother and child. More important is the failure of development of the nervous system during embryonic life, with its tragic postnatal retardation of mentality. Treatment of the mother during pregnancy should aid in preventing congenital hypothyroidism.

The next opportunity for early diagnosis of congenital hypothyroidism is at birth. Roentgenographic studies of the osseous system have demonstrated that at birth the *normal* infant has the following osseous nuclei present: lower epiphysis of the femur, upper epiphysis of the tibia and two tarsal bones (talus and calcaneus). Routine X-ray examination of the knee and ankle of the infant at birth would indicate, through its ossification, a possible hypothyroidism, and whether or not its nervous system had been properly unfolded during intra-uterine life.

The first year's chronological development is the next indication of congenital hypothyroidism. Early manifestations of this condition are as follows: (1) Overweight at birth (more than 8 lbs.). (2) Late separation of the cord (after the second week). (3) Failure to support the head unaided after the fifth month. (4) Delayed dentition (after the seventh month). (5) Delayed walking and talking (after one year). Following the first year, hypothyroidism concerns statural growth and mental progress from infancy to adolescence. A latent, or potential, hypothyroidism may present a transient *decreased* thyroid

function under many common forms of stress and strain. Adolescent colloid goiter, though most often self-curative, should be a danger signal indicating that the thyroid function might not later respond to additional demand, such as imposed by infection, intoxication, extreme emotionalism and maternity. Adolescent goiter preceding conception thus enhances the possibility that the offspring might be overweight at birth and have the mental incompetency of congenital thyroid deficiency.

For early diagnosis of pituitarism, the ancestral and parental history should be elicited with reference to clinical entities such as gigantism, acromegaly, pituitary tumor, girdle adiposity, Froehlich's syndrome and Lorain-Levi disorder. Isolated complexes referable to menstrual disturbance, headaches, epilepsy (pituitary type), diabetes insipidus and hypophyseal glycosuria should be a warning as to hereditary transmission. Pregravid clinical signs of these syndromes, which are usually exaggerated by pregnancy, should be determined. The pituitary infant frequently has a precocious eruption of the teeth. The lower incisors appear as early as the second to the fifth month, instead of at the sixth or seventh. Pituitary children are never mentally retarded. Ordinarily, the first gross evidence of hypopituitarism is not presented until juvenile life. *At this age epoch, juvenile obesity is a positive sign of inactivity of the hypophysis.*. So few associated symptoms exist that these juvenile adiposities are in many instances disregarded. They rarely receive treatment until after adolescence, when a failure of sexual development is noted. In the male, the external genitalia are definitely aplastic. In the female, the aberrant genital function is evidenced in amenorrhea, metrorrhea and dysmenorrhea. In gonadal deficiency, there is a delayed epiphyseal fusion, with consequent long bone overgrowth. Comparative tabulations of the normal ages for epiphyseal union have been an aid in the prepuberal diagnosis of such disorder. The most suggestive sign of hypogonadism, a rapid prepuberal long bone overgrowth, produces an abnormally tall stature. There is a coincident lack of development of primary and

secondary sexual characters. In the male, cryptorchism and external genital aplasia are readily diagnosed by inspection and palpation. Delayed, decreased menstruation occurs in the female. *Hyper*genitalism manifests a prepuberal development of primary and secondary sexual characters, with precocious somatic changes and, in one group, a hypertrichosis.

Preventive Treatment. Amenable endocrine disorders in both parents should be treated before conception. Marriage centers have been organized in Germany for the purpose of counteracting the propagation of these and other degenerative manifestations.

Hypothyroidism. It is essential to treat the *endocrinous* gravid woman, particularly if afflicted with a disorder so remediable as hypothyroidism. Thyroid extract sufficient to maintain the basal metabolic rate at from +15 to +25 per cent. should be administered during the entire term of pregnancy. A smaller dosage should be continued during lactation, as by this method the infant will receive thyroxin through the mother's milk. In addition, direct substitutional treatment to the hypothyroid infant should begin soon after birth. This consists of powdered desiccated thyroid gland given in some suitable infant food. The entire daily amount is given in one nourishment instead of in fractional dosage. The initial dose for a positive thyroid deficiency at birth should be not less than gr. 1 (0.06 gm.) daily. Ordinarily, this should be increased by gr. $\frac{1}{8}$ (0.0075 gm.) every six weeks until the infant is a year old. At the end of the first year, the child should be taking a daily amount of at least gr. 2 (0.12 gm.). Unless a metabolic chamber is available, the only reliable index to the maximum tolerable dosage is the rectal temperature. The mother is instructed to obtain the range of rectal temperature by making and recording estimations twice daily. A rise of more than one degree in temperature range is considered sufficient to withdraw the thyroid treatment for a few days, in order to determine whether maximum tolerance has been reached. After withdrawal of the thyroid

medication, if no other cause, such as gastro-intestinal upset or infection, for the abnormal temperature is discovered, the dosage causing the temperature elevation should be reduced by gr. 1/8, and continued for six weeks, when an increase of gr. 1/8 should be again attempted under the same guidance. Between two and four years of age, the hypothyroid child will ordinarily require gr. 2 to 2½ of desiccated thyroid gland. After five to six years, the dosage should not exceed gr. 4 to 5 daily. A decrease in dosage, or a complete withdrawal of treatment, may become necessary, depending upon the course. The osseous development, as shown in serial radiograms of the growing nuclei, and an improvement physically and mentally, are general guides indicating the efficacy of treatment. Marine's prophylactic treatment to school children for thyroidism should be uniformly adopted on entrance to public schools at the age of five to six. This consists of sodium iodid gr. 2 once daily for two weeks, twice a year.

After the age of four, *pituitary treatment* may be indicated in addition, as the congenital hypothyroid usually acquires an insufficiency of either the anterior or the posterior lobe, or of both lobes, of the pituitary gland. The engrafted pituitary deficiency presents a non-obese (anterior lobe) or an obese (posterior lobe) type of cretin. The anterior lobe, or non-obese, type has a more retarded osseous and genital development than does simple hypothyroidism. In the *non-obese* cretin, in addition to thyroid therapy, extract of the anterior lobe pituitary gland, ½ to 1 c.c. *intramuscularly* two to three times weekly, has been an efficacious adjunct. In *obese* congenital hypothyroidism, the hormone of the posterior lobe pituitary to the "intestinal reaction" is given. The initial dose is 2 to 3 minims of extract of posterior lobe intramuscularly. This is raised by 1 minim each dosage to the amount productive of *abdominal cramping* and *defecation* within twenty minutes after the injection. The "intestinal reaction" is considered as the index to the maximum tolerable dosage of this hormone. This dosage should *not* be exceeded, and is maintained until clinical improvement is obtained. Ordinarily,

two to three hypodermic injections weekly are sufficient, although the maximum dosage may be given twice daily, if necessary. The conspicuous therapeutic reactions are the weight reduction, redistribution of adiposity and improved mentality.

Pregnancy should not contraindicate operation for relief of hyperthyroidism. In fact, if thyrotoxicosis is not controlled by other means of treatment, surgery is imperative. The thyroid intoxication is more harmful to both mother and infant than the possible effects of subtotal thyroidectomy.

Hyperpituitarism, due either to tumor or to functional hyperactivity of the hypophysis, is best treated by Roentgen ray to the pituitary gland. This is more urgent in the event of pregnancy. Hypopituitarism demands hypodermic administration of pituitary extract from either or both lobes, as previously described. The descent of the testicle in infantile cryptorchism apparently is facilitated by giving desiccated thyroid. This is probably more effective in congenital hypothyroidism with cryptorchism than in the non-thyroid child. Preadolescent hypogonadism in the male is favorably treated in *some* instances by the hypodermic administration of extract of the anterior lobe of the hypophysis. Orchic extracts and substances have been found inert. Ovarian substance is given hypodermically in positive hypogonadism in the female, even in the preadolescent age.

The most effective treatment for calcium deficiency is obtained from a review of Aub's work. Administration of Collip's parathyroid hormone in tetany in a state of coma or convulsions restores the calcium balance, so as to relieve temporarily, the serious clinical manifestations. Aub has shown, however, that this increase in calcium mobilization is not maintained by parathyroid hormone longer than four or five days. After this time, excessive dosage of this hormone does not raise the calcium metabolism or prevent recurrence of clinical symptoms. Desiccated thyroid substance and ammonium chloride given orally will maintain

the calcium balance for a rather prolonged period. For this reason, these should be used as auxiliary treatment in any calcium deficiency. Desiccated thyroid gr. 3 to 5 daily and ammonium chloride gr. 5 to 10, three times a day are considered the average dosage. Calcium solution 10 per cent., in dosage of 10 to 20 c.c. intravenously, is usually sufficient to relieve post-operative tetany temporarily, and often permanently. Calcium lactate or calcium chloride, dr. ½ to 1 three times daily, is usually exhibited. Owing to its insolubility when given orally, smaller doses have little value. The treatment of acidosis or alkalosis as a terminal state in various severe, acute medical or surgical conditions, on the basis of calcium balance, is certainly worthy of consideration. The effect of calcium balance upon the acidity or alkalinity of the blood as related to the prevention or cure of gastric or leg ulcer, should also be borne in mind. The *early correction* of all calcium deficiency types of spasmophilia, asthma and urticaria might have some bearing in adult calcification, such as is present in arteriosclerosis, otosclerosis and arthritis.

It is questionable whether, with the exception of thyroid substance, the desiccated substances from the various *endocrine glands* have any effect when given orally. Ordinarily in these cases, the desiccated powders of other endocrine glands are given by mouth, in addition to the hypodermic medication. They have no deleterious effects, and possibly are helpful in recent mild hypo-endocrinism. At present, there is no effective treatment for the various types of *hyper*genitalism. Treatment for diabetes mellitus in infancy is too well known to require special comment.

CONCLUSIONS

(1) Endocrine disorders promote presenility mostly through their degenerative effect upon other systems.

(2) More important than this predisposition to senilism *is their production of human incapacity and incompetency.*

(3) Early diagnosis, pregravid, prenatal and natal, is possible in many endocrine disorders.

(4) Preventive *endocrine* treatment is a most fruitful medical field in incretory defectiveness, delinquency and presenility.

ARTERIAL DISEASES OF THE BRAIN AND CORD[1]

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All cells in the body can multiply and reproduce with the exception of those in the nervous system. These only are laid down in the embryonic life and growing as the individual becomes adult stretch out their processes in every organ and area of the body. When maturity of age has been attained, they no longer grow. They never reproduce themselves. Under these conditions, it follows that of all cells they are of necessity most long lived, but also of necessity they must alter with the changing condition of the entire organism. Some die long before their owner, and massive atrophy of the neural parenchyma is probably the most outstanding characteristic of the senile brain. However, one must emphasize that senility of structure is not produced by great age only; no individual over seventy-five is without alteration of brain tissue, but many persons twenty years younger have diffuse lesions in no way different from those of utter senility. Indeed, any severe infection or intoxication is capable of giving rise to cellular changes in the brain indistinguishable from those found in persons sorely stricken in years. Such infections act not only on the cells of the brain, but on the cells and fibres of nourishing blood vessels and by the devascularization thus produced secondary nerve changes are set up.

This change in blood vessels is altogether too causatively associated in our minds with the idea of age; much more should we think of it as due to all the infections and intoxications to which the body has been exposed throughout life. Such attacks have usually had but ingravescent and insid-

[1] Delivered October 3, 1928.

ious results and only after many years are these results made manifest in clinical symptoms and anatomical change. Therefore, in the majority of cases arteriosclerosis only appears in old age, but it is a product of many decades and we can all call to mind children and youths with arteries, as the saying is, of an old man. We are entirely too prone as a profession, to regard our current methods of research as ultimate and decisive and so to consider that no infection or intoxication exists in an individual if we have been unable to find it. By the same token psychiatrists too often assume a mental disease to be functional, "tooted in the mind," having a pathology in the lambent ether, a morbid process suspended somewhere, like Mahomet's coffin, between earth and heaven, for no better reason than that with our as yet crude methods, we have failed to find notable alteration in brain tissue. Let us remember for instance that only twenty years ago or less, Parkinson's disease was called functional, a neurosis, though we now know it is dependent on very precise changes in the cells of the lenticular nuclei. So far are we from having reached an ultima Thule in knowledge or technique that we must recognize that we have but lately embarked on our voyage of discovery.

As yet almost no progress has been made towards increasing the span of individual life. However, recognition of the fact that arterial degeneration is not the sure result of the inescapable years, but is a product of infections and intoxications occurring in those years, gives us a lively hope that Medicine may yet succeed in making life long by making life healthy. As man is conquering the foes in his environment, he may be trusted to conquer those within himself. In the meantime, however, arteriosclerosis is being manufactured in us poor ignorant ones, seldom in a generalized fashion, more often as localized lesions. Often advanced cerebral arterial change can be detected in persons lacking any sign of arteriosclerosis elsewhere, and the reverse situation also is found. Changes in the vessels of the brain give rise to a chain of focal lesions—areas of cerebral softening which are so often fatal. Such large

lesions are seldom primary. Long standing cerebral defects are always found whereby vessels are deteriorated and parenchyma made friable, atrophied, vacuolated; such alterations may not produce remarkable clinical symptoms, but they make almost inevitable a death by cerebral accident.

The senile brain is characterized by an amazing reduction in mass; the brain is retracted from the skull and from the membranes which are themselves often no thicker than tissue paper, and in which are frequently occurring osseous plaques. The meningeal vessels are spaced and small. The convolutions are thin and divided by deep sulci of greater size than the convolutions they surround. The convolutions are granular and wrinkled, and, most mysterious of all these conditions, the posterior third of the brain may be almost normal. We have no theory even on why the changes wrought by intoxications or old age should so persistently choose the frontal and parietal situations, but then we don't know why diphtheria should first strike part of the 3rd nucleus, why poliomyelitis should so avoid the posterior spinal horns, why encephalitis should be almost confined in lesions to the basal ganglia, or for that matter why tuberculosis should make a bilateral destruction of the adrenal bodies. Here again we need knowledge on infections and the forces which determine their paths of invasion.

The ventricles are always dilated in the aged, due less to increased cerebrospinal fluid than to the mass reduction already described which may reach 200 grams by weight. The corpus callosum as one would expect is slight, and is usually but a third its normal adult size—a reduction in association tracts which is not unrelated to the fading memory power of the aged. The cerebellum is affected though to a less degree than the frontal lobes; one case of reduction in cerebellar mass by two-thirds of its bulk has come under my observation, a man 82 with progressive bilateral cerebellar ataxia accompanied by intense general emaciation.

The nerve cell degeneration has been made especially clear by the use of Nissl's stains and the newer reactions of Ramon y Cajal and Hortega. The cells of the cortex are reduced in number showing that many have vanished utterly. Others, alongside healthy cells, are atrophic, pigmented or have undergone fatty degeneration, with increased production of neuroglial nuclei.

The large vessels are always atheromatous, especially those of the Circle of Willis. The smaller intracerebral vessels seldom lack lesions of different degrees of incidence, characterized by proliferation of the inner coat with shrunken lumen. Perivascular leucocytosis is the rule. Occasionally there is sclero-hyalin degeneration in which the entire wall is changed into a homogeneous hyalin mass, and again calcareous deposits and fatty degeneration may occur in the smaller capillaries.

Small focal lesions in cerebral tissue, some of microscopic size, are found as the result of vessel obliteration: as has been said these disseminations always precede the large focal lesions which produce paralysis and other easily recognized symptoms. Indeed, foci of miliary softening are often found scattered below the cortex, and these may be found side by side with perivascular gliosis. In the brains of persons who have suffered a senile dementia or even a number of transient cerebral palsies it is common to find lacunae with irregular walls containing granular debris or red blood cells.

It is uncertain whether senile dementia should be called a disease of the cerebral parenchyma or the cerebral vascular system. However, as our consideration of the morbid structure has just shown, it is almost impossible to divide the influences of the two associated deteriorations. The aged suffer a reduction in mental and physical power —there is an especial poverty in the faculty of creative imagining—many old people of genius or even talent have done mighty work—Titian, Michelangelo, and Voltaire come at once to the mind—but rarely do they create a new style, evolve a method different to that of their adult ma-

turity—old men of genius may soar magnificently on the Pegasus of their conditioned reflexes, but never do they find fresh horses! The person becoming senile has a loss in memory and especially for those memories most recently acquired. A loss of memory for nouns is pronounced and for proper names in particular, probably owing to the few associations united to such memories. He grows more and more egotistical and irritable. Somatic sensations especially from the gut play an increasing part in his mental and emotional life, and this increasing attention to his internal workings depresses his faculty of attention for his environment. Judgment is passed, therefore, on facts poorly received, suspicion is aroused and a sense of umbrage and persecution developed. The avarice of the aged is a return to the acquisitiveness of the young child, the whole mental life undergoes devolution so that nursery rhymes long forgotten may be the sole articulated product.

During this process in its beginning the senile is not without insight into his condition, he is forever on the defensive and talks jargon carefully to conceal his memory defects. His automatism sustains his front and sometimes cross examination exceeding the bounds of courtesy is needed to reveal the underlying poverty of ideas, attention or memory. Associated with these psychical alterations there is often vertigo, which may well be the result of true cerebral intermittent claudication, insomnia by night and sleepiness by day, transient apoplectiform attacks or short epileptic seizures with fleeting attacks of aphasia.

In the early stages, the patient is merely slowed up in his reaction time, enfeebled in his power to grasp abstract ideas and acutely aware of his condition. He fears insanity and complains of bagatelles. It should be stated here that certain cases of cerebral arteriosclerosis are indistinguishable by symptoms and almost so by autopsy from cases of general paralysis—the Wassermann reaction in the cerebrospinal fluid in such difficulties offers the only clue to correct diagnosis.

Apoplexy or severe cerebral thrombosis with retention of life and partial recovery and contracture are seen in the adult of late middle life—not in the aged. And for the simple reason that large lesions of destruction are usually fatal to the very old. That is not to say that hemiplegias of vascular origin cannot affect old people; they do, but the attack is less fulminant and the symptoms tend to regress. The hemiplegias of the old are less likely to be due to a blood effusion than to the breaking down of a lacuna in the brain. Pierre Marie warns us to be careful to avoid favorable prognoses in these lacunar hemiplegias; they depend for their production on diffusion of lesions in lacunar brains, which Marie describes as *vermoulé*—worm-eaten. The patient rarely falls unconscious in an attack, he gets dizzy and notices his hand and leg, or both, weaker and clumsier than usual, or he experiences notable difficulty in speech, a fleeting dysarthria. These symptoms improve and he may be well in a few days. In a week or two these symptoms may recur, perhaps on the opposite side of the body; the gait may be typically hemiplegic, but more probably it will be one of small quick steps (*Marche à petit pas*) in which each foot is advanced in front of its fellow by only a few inches. There may be retropulsion alternating with this odd little quick-step forward. The coordination of facial movements is impaired, the face may be asymmetrical, or one side of it may be incapable of emotional expression if the thalamus has been affected; a hemianopic quadrantic defect in the visual field may appear. Synergy and balance may be impaired, and in right sided hemiplegias there are dysarthrias and difficulty in swallowing. A peculiar and typical dysarthria is the necessity of forcible explosive repetition of key words in a sentence. "I want, want, want a knife, knife, knife." If the lacunar disintegration has been bilateral the picture produced may be that of pseudobulbar palsy with spasmodic involuntary laughing and crying—the emotional expression being usually irrelevant and inappropriate to the producing stimulus.

There is little to distinguish senile epilepsy from the

epilepsy of youth. Both major and minor forms occur, the aura and initial cry are less common, the coma after the fit more prolonged. Senile epilepsy, however, either produces or is accompanied by rapid mental enfeeblement. It is definitely a product of arteriosclerosis, and such brains are characterized by lacunar and senile plaques.

To have to listen to a narrative of the delapidation of the master organ of life is lugubrious and depressing; the picture looks like one of annihilation, a going down to oblivion and the dark shadows—but into that blackness man's spirit throws a mighty beam, for

* "If it be Life that waits we shall live forever unconquered.
If Death, then we shall die at last, strong in our pride and free."

MENOPAUSAL AND POST-MENOPAUSAL CONDITIONS IN WOMEN [1]

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The menopause is a very definite epoch in the life of a woman with which there is nothing comparable in the life of a man. Whilst it is determined by strictly physiological processes these may easily pass on to the pathological, and the physiological readjustments which take place may bring to light hitherto unrecognized and unnoticed dysfunctions in the different organs and systems in the body.

For an understanding of these pathological states it is necessary to have as clear an idea as possible as to what the menopause is, how it is brought about, and what are its normal effects on the various tissues, organs and systems of the body.

* Inscribed on Memorial Chapel to the Scottish War Dead, Edinburgh Castle.

[1] Delivered October 4, 1928.

The Normal Menopause

The menopause is the time at which the female reproductive organs cease to function. This cessation of function is directly due to the exhaustion of the primordial follicles in the ovaries so that ovulation no longer takes place and conception is impossible. At the same time the internal secretion of the ovaries fails and menstruation ceases. There then takes place a slow, atrophic change in all the organs of generation, internal and external.

The withdrawal of the ovarian secretion from the circulation causes a temporary upset in the function of other glands of internal secretion such as the thyroid, suprarenals and pituitary. This upset may be evidenced by tissue changes and general symptoms of various kinds and these may be so marked as to constitute a pathological state. It may, however, be stated at the outset that in the average woman with healthy organs the menopause causes very little general upset and is not accompanied or followed by any pathological lesions of the pelvic organs.

In considering the pathological menopause, and disabilities arising from it, it will be well to take up separately the local pelvic lesions, and then disturbances in other organs and systems.

Menopausal Hemorrhage

The actual cessation of menstruation may take place in a variety of ways. It may occur suddenly and completely without any warning. This is unusual except in those cases where the menopause has been induced artificially by removal of the ovaries at operation or by X-ray or radium treatment.

More often the periods first of all become irregular the patient skipping one from time to time, and losing less and less blood at each. The intervals between the periods gradually lengthen until complete cessation occurs. In other instances the amount of the flow may be increased and the periods be more frequent than normal. These con-

ditions may obtain for several months or even years before menstruation completely stops. In some such cases the flow becomes very excessive so that it amounts to flooding and the patient may be reduced to an extreme degree of anemia.

It is important to recognize these different ways in which the cessation of menstruation may occur in order to distinguish the physiological from the pathological.

As has been stated cessation of the periodic menstrual flow is due to the withdrawal of the internal secretion of the ovary from the circulation. This withdrawal is as a rule a gradual process and whilst it is occurring certain changes of the nature of a senile atrophy are taking place in the uterus, both in its muscular wall and in its mucous membrane. In the uterine wall there is a gradual replacement of muscle fiber by fibrous and elastic tissue and in the mucous membrane the stroma becomes more fibrous, the blood vessels become fibrosed and the glands atrophy. The endometrium becomes more and more like any other mucous membrane in the body. As the stimulus from the ovarian secretion becomes less strong so the response of this fibrosing uterine mucous membrane becomes more and more feeble. There are fewer active proliferative tissue changes in the premenstrual period, less congestion and, therefore, less loss of blood at the period, and more feeble regenerative changes in the post-menstrual period. The endometrium thus becomes more and more a fixed passive tissue and ultimately so fibrosed as to be incapable of any response to the ovarian hormone.

The smooth, well-ordered menopause, with gradual cessation of menstruation is dependent upon the diminution in the amount of ovarian hormone and the fibrotic changes in the uterus occurring simultaneously and in equal degree.

If the ovarian secretion fails abruptly there will be a sudden and complete cessation of menstruation although the uterus has undergone little or no atrophic change.

On the other hand if the fibrotic changes of the uterus are in advance of the degenerative changes in the ovaries the patient will almost certainly suffer from menorrhagia which may amount to flooding. The reason for this is that the ovarian secretion is still powerful enough to call forth the histological changes in the uterine mucous membrane which culminate in the menstrual flow. That flow is excessive and prolonged, firstly, because the uterine muscle, partly replaced by fibrous tissue, is no longer capable of normal contraction and, secondly, because capillaries in the endometrium have become thickened and sclerosed and are no longer capable of closing by collapse of their walls as they normally should. There is thus both an excessive blood loss and prolongation of the period. This I think is the most rational explanation of the excessive menstruation which not infrequently antedates the menopause and also of these cases of profuse hemorrhage occurring in women in the late thirties and early forties.

In these latter there are usually other clinical evidences of premature fibrosis uteri such as lacerated and infected cervix, large, hard, heavy tender uterus, and occasionally inflamed appendages. The cases of severe pre-menopausal and menopausal hemorrhage due to early and excessive uterine fibrosis do not respond to any form of medical treatment. The uterine wall is incapable of any reaction to such drugs as ergot or pituitary extract. Curettage while necessary for diagnosis is not curative so that if the menorrhagia is severe resort must be had to radiotherapy or hysterectomy. In the choice between these forms of treatment some regard must be had to the possible etiology of the condition. Some of the cases show undoubted evidence of chronic infection with lacerated, eroded and thickened cervices as well as enlargement and sclerosis of the body. In such the patients present a picture of a chronic toxemia in addition to that of anemia and, in my experience, a total hysterectomy gives them the best hope of good health in the future. On the other hand, we may find the cervix healthy and the only disability of the patient that due to blood loss. In such radium or X-ray

treatment is better—always, of course, preceded by a diagnostic curettage.

I believe that a big field of preventive medicine is open to obstetricians and gynecologists in the early recognition and treatment of cervical tears and infections following childbirth as a prophylactic against the development of chronic metritis or fibrosis uteri with its attendant menorrhagia in the later years of sexual life.

There is another histological picture found in some cases of severe menopausal hemorrhage, namely, what we have come to call a cystic glandular hyperplasia of the endometrium. In this condition the endometrium is thickened, the stroma is of normal structure, the blood vessels are large and numerous, but not thickened, and the glands are irregular in size and shape, many of them large and dilated and all with active epithelium. This condition while most commonly seen near the time of the menopause may occur in quite young women. Like fibrosis it is not amenable to drug treatment or curettage and may call for radiotherapy or hysterectomy.

The constant problem that presents itself to us in all these cases of excessive and of irregular bleeding at or near the age of the menopause is that of determining whether the bleeding is really menstrual in origin or whether it may be a symptom of a new growth and especially of a cancer of the cervix or body of the uterus.

It goes without saying that every patient presenting herself to us with these symptoms should have a most careful and complete pelvic and general physical examination. This is sufficient to exclude gross cancer of the vagina and the portio vaginalis of the cervix. It tells us nothing of the upper reaches of the cervical canal or of the endometrium. Information regarding these can be got only by a dilatation of the cervix and curettage of the uterus followed by histological examination of the tissue removed.

Under what circumstances is it our duty to recommend and urge this? In what instances may it safely be dispensed with?

It is necessary to formulate some sort of answer otherwise we should on the one hand miss some early cases of cancer or, on the other, subject needlessly a very large number of women to surgery. In general terms it may be stated that if the bleeding is periodic, lasts only a certain definite number of days and then stops, is preceded and accompanied by the feelings the patient has learned to associate with menstruation, then no matter how excessive it may be it is menstrual in character. Such bleeding is not caused by carcinoma of the endometrium. It may be caused by a fibroid tumor, by a fibrous polyp, by a fibrosis uteri, or by a cystic glandular hyperplasia. In these cases the amount of blood loss and its effect upon the patient will be the determining factor for or against diagnostic curettage and further surgical or radiological treatment.

Again, if a woman has apparently had the menopause established after a period of irregularity and then four, six, or eight months later again has vaginal bleeding a careful pelvic examination must be made. If such examination reveals nothing abnormal in cervix or vagina we are justified in waiting a short time before urging a curettage. If the bleeding stops in a few days and there is no recurrence we can conclude that it is a belated menstruation. On the other hand if it continues for over a week or stops in a few days and then recurs, no matter how slightly, diagnostic curettage ought to be urged.

If uterine bleeding of any character occurs more than a year after the menopause and nothing can be found on ordinary pelvic examination to account for it we fail in our duty to our patient if we do not advise exploration of the uterus. In this connection let me urge that even when an apparent explanation for the bleeding is found, such as a small cervical mucous polypus, it be not concluded that that is the only cause of the bleeding. I have seen in consultation two patients who had such polypi removed by their doctors in their offices, who continued to bleed, and who both turned out to have carcinoma of the en-

dometrium. I make it a rule when a woman past the menopause has vaginal bleeding and a cervical polyp is found that she be given an anesthetic, and the uterus be curetted when the polyp is removed.

If we remember the simple fact that cancer of the uterine endometrium or of the cervix bleeds because it ulcerates and that, therefore, the bleeding is independent of, and unrelated to, menstruation we shall be in less hesitancy as to the type of case in which exploration of the uterus is obligatory. In a case of advanced fibrosis uteri with actively functioning ovaries there is practically continuous bleeding because the blood vessels of the endometrium opened up as the result of one menstrual stimulus have not closed before the next stimulus arrives. In such a case a diagnostic curettage is the only means of distinguishing it from carcinoma or other uterine lesion.

A fibrous polypus projecting from the cervix and ulcerating causes intermittent or continuous bleeding, and such polypi are most often found in women at or after the menopause. The atrophy of the uterus in the post-menopausal period is a factor in extruding such tumors from the uterine wall and out through the cervical canal. It is interesting to note that very often such tumors are found in women who have had several children—the type of patient in whom one least expects to find the ordinary fibroid during active sexual life.

The only other bleeding condition to be mentioned now is senile endometritis, a condition occurring some years after the menopause in a uterus which has undergone extreme atrophy and in which, as a rule, the cervical canal is occluded by plastic adhesions. This occlusion of the cervix is not permanent or complete for it, apparently, allows access to the uterine cavity of organisms of decomposition which acting on the necrosing lining of the uterus produce an extremely fetid discharge. This may escape into the vagina from time to time and in nearly all cases it is blood stained as a result of deep ulceration into the uterine wall. The occurrence of such a fetid blood-stained

discharge in a woman past the menopause, of course, at once conjures up the picture of cancer. It is only on diagnostic curettage that that diagnosis can be excluded. In cases of so-called menopausal or post-menopausal arthritis the possibility of partial occlusion of the cervix and the locking up of small pockets of pus in the canal or in the uterine cavity should be borne in mind. There are numbers of cases on record where the draining of such collections has resulted in a disappearance of the joint condition.

Leaving now the uterine hemorrhages let us turn for a moment to other conditions arising as a result of the atrophic changes following the menopause. Of these, by far the commonest is cystocele. If the proper supporting fascia of the bladder has been grossly injured during childbirth a cystocele will develop very soon after. Such a cystocele tends to become progressively larger up to and after the time of the menopause. In many instances, however, the damage has not been sufficient to result in a definite prolapse of the bladder at the time and this may not become apparent until one or two years after the menopause when it gradually develops as the result of loss of support due to atrophy of the pelvic fascia. In such cases incontinence of urine, an inability to retain urine under such strains as coughing, laughing, or making a sudden movement, is a common symptom. As a rule cystocele and prolapse of the other pelvic organs become aggravated after the menopause. It is, therefore, well to advise patients with these conditions to have them treated operatively as soon as their child bearing period is over and certainly before post-menopausal atrophy has rendered the proper fascial and muscular supports of the organs feeble and difficult to define.

I never operate on a case of prolapse in a woman over fifty without thinking of all the years of disability she has gone through, putting off the evil day of operation in the hope that the change of life would make things better and finding instead that it made them worse.

Normally after the menopause the folds of the vagina become smoothed out, the epithelium becomes thin and the walls contract, especially in the region of the fornices which become shallower and shallower until the roof of the vagina becomes cone-shaped with the small atrophied cervix at its apex. At this stage the uterus has become a shrunken organ and as a rule lies in a position of slight retroversion. At this time a condition known as senile vaginitis may develop. This takes the form of small areas from which the epithelium has become completely desquamated and which exude a watery discharge, often blood stained. These areas have a red color giving to the vaginal walls a red, irregularly mottled appearance. Saprophytic organisms grow on the desquamated epithelium producing a thick, often fetid, discharge, which irritates the lower reaches of the canal and the region of the vestibule and vaginal introitus. The patient suffers from itching and pain and may be rendered extremely miserable. There is a tendency for the walls of the vagina to become adherent especially at the roof and dyspareunia may be a prominent symptom. As the result of atrophy in the vestibule there may be undue exposure of the urethral mucous membrane which becomes inflamed and sensitive. Or, a urethral caruncle may develop.

The early stages of this condition of senile vaginitis may be present before the menopause is established. It is important to recognize them then, as treatment may be effective. The application of iodine or of 15 per cent. nitrate of silver solution to the individual areas together with the administration of ovarian substance may be curative. When the discharge is fetid and blood stained no treatment should be undertaken until a possible carcinoma of cervix or fundus uteri has been ruled out.

An extensive atrophic condition may develop in the vestibule, in the labia minora, and round the vaginal entrance. The epidermis becomes thin and the sub-dermic tissue undergoes extreme fibrosis and contracture. There is a severe pruritis and pain from the contraction of the

parts. To this condition the name kraurosis has been given. It is extremely resistant to treatment although good results have been recorded in a few cases from the use of ovarian extracts. It is a condition to be distinguished from leukoplakia vulvae which affects the skin surfaces outside the region of the vestibule and which is often a precursor of cancer. Kraurosis is not a precancerous condition except in so far as the severe itching may lead to the production of abrasions and fissures by scratching. Such areas in elderly people are never free from danger.

Pruritis vulvae is a generic term applied when any condition produces itching in the vulvar and perineal region. It is commoner at the time of and after the menopause than at any other period of life. It always calls for the most careful investigation as it may be due to such a variety of conditions—pediculi, round worms, glycosuria, irritating cervical and vaginal discharge, leucoplakia, kraurosis and cancer. In some cases all of these can be ruled out and no lesion is detectable except that due to scratching. In such, treatment by X-ray often gives relief. A few words may be said regarding the effect of the menopause on pelvic neoplasms.

Uterine Fibromyoma

It is a well recognized clinical fact that a woman with uterine fibroids tends to have a delayed menopause. Such women often go on menstruating till well over fifty. It is, therefore, a mistake to encourage a woman who is having menorrhagia from a fibroid tumor to wait for the menopause for relief. She may be incapacitated for the best years of her life if she does so. While small, symptomless fibroids usually undergo retrogression and may practically disappear after the menopause, these which give rise to symptoms of any kind ought to be treated by operation or by radiation whenever these symptoms call for it. At and after the menopause various degenerative changes may occur in the tumors and may make their removal advisable. One of the commonest of these is cal-

cification, which may render the tumor so heavy as to cause pressure symptoms necessitating operation. Reference has already been made to the extrusion of a fibrous polypus at or after the time of the menopause.

Cancer of the Uterus

One of the very interesting facts regarding the age incidence of cancer is that cancer of the cervix occurs at an earlier age than cancer of the body of the uterus. The former is common at about the age of the menopause—thirty-eight to fifty. The latter is common in the years which succeed the menopause—fifty to seventy.

Ovarian Tumors

Ovarian tumors may be present at any age. Those seen in very young girls and those seen in women after the menopause are more likely to be malignant than those occurring in women during their active sexual life. An ovarian tumor in a woman of fifty or over, especially if associated with ascites, should always be regarded with the greatest suspicion.

Let us now turn for a short time to a consideration of the normal changes and the possible disabilities which may occur in the woman generally, at and after, the menopause. These result from the withdrawal of the ovarian hormone from the circulation. I shall not dwell long on this part of the subject as the speaker who is to follow me will deal with it in a much more informed and authorative way than I can.

While it is true that the ovary is essential for reproduction and its internal secretion is necessary for the function of menstruation and for the maintenance of the uterus in such a condition that it can embed and nourish a fertilized ovum yet the ovary in its turn is dependent on other organs for its efficiency. The more the actions of the various ductless glands are investigated the more apparent

does it become that there are various and complicated interactions between them and that the failure of one will lead to disordered action in the others. Thus while the menopause is directly due to the failure of the ovary to produce and pass into the circulation its hormone or hormones this failure may be the result of dysfunction of one of the other ductless glands. Thus a thyroid or a pituitary deficiency may lead to amenorrhea and to sterility long before the usual age of the normal menopause. We see this in the case of the thyroid in myxedema and in the case of the pituitary in Frœhlichs dystrophia adiposo-genitalis.

So, conversely, when the ovarian secretion fails there are effects on the other ductless glands and these effects may produce symptoms. In the normal natural menopause the withdrawal of the ovarian secretion is a slow, gradual process and the adjustments take place with little disturbance to the individual. If, however, the ovarian secretion is withdrawn suddenly at the time of the natural menopause or as the result of castration, either by operative removal of the organs or by radiation, marked general disturbance may result. In this connection it is interesting to note that the symptoms of the artificial menopause are always more marked and more prolonged after the removal of comparatively healthy ovaries than after the removal of those more grossly diseased. In the latter case there has been a gradual failure of function and readjustments have been going on before the final ablation.

I heard from a colleague the other day of a patient who had a castration dose of X-ray fifteen years ago to render her sterile and who now at the age of forty-five suffers from menopausal symptoms as intensely as she did a year after treatment.

Most women have an altogether exaggerated and distorted idea of the disabilities and dangers of the menopause. This is due to that unfortunate trait in the character of the average woman which impels her to communi-

cate to her kind all the stories of distress and disaster which may have come to her notice and to let nothing be lost in the telling thereof. It has always seemed to me strange that such tales should be so common regarding natural processes like childbirth and the menopause and that an educational campaign should be necessary to instill a little knowledge regarding the early symptoms and nature of cancer.

In the average healthy woman the menopause is not accompanied by distressing symptoms and it is not likely to precipitate disease in extra-genital organs. She may experience certain vasomotor disturbances such as hot flushes and sudden perspirations, slight attacks of dizziness or of headache. These are the result of imperfect vasomotor control as the result of the gradual withdrawal of the ovarian secretion. Such symptoms are usually more marked with an artificial menopause due to castration than with a normal climacteric. They are best relieved in my experience by the administration of a preparation of Whole Ovarian Gland. I know that it is held by many and they have some scientific evidence for their belief, that the oral administration of all gland preparations except thyroid is valueless as their active substances are not absorbed through stomach or intestine. I have no proof to the contrary, but I have frequently noted clinical improvement in patients with the above mentioned symptoms when ovarian substance has been given by mouth. When both ovaries have been removed by operation the implantation of even a thin slice of one of them into the rectus muscle postpones and may ward off altogether these unpleasant symptoms.

General nervous symptoms, of which the commonest are irritability, inability to concentrate, and mental depression occur in a certain number of women These symptoms are the same as those which many women experience during and towards the end of each menstrual period. It has been conclusively proved that "in the organism of the healthiest woman there is a monthly period of depres-

sion in her vital processes which finds definite expression in all her activities" including the psychic and nervous (Graves). When the monthly cycle is disappearing at the menopause this period of depression may become more prolonged and may last for weeks or months instead of days. If there is an inherent or inherited instability of the nervous system all the symptoms will be more marked. They are aggravated by dwelling upon them and by the fact that at this time many women are leading an aimless and purposeless life. Their children have grown up and have homes of their own. Their households no longer demand the greater part of their day. They have no mental occupation and fall an easy prey to depression and ennui. As Brettauer lately pointed out, if more women cultivated a hobby which would occupy and interest them after their retirement from the active business of rearing a family and managing a household there would be fewer psychoneurotics.

One might mention a host of other pathological conditions occurring in women at or after the age of the menopause but these would be outside the scope of our subject for they are in no way related to the menopause as such, but are incident to the aging process and will be dealt with or have already been dealt with by other speakers.

For most women fortunately the years which succeed the menopause are the most peaceful, the most mentally productive, and the most satisfactory in their lives.

UROLOGY, ITS CONTACTS WITH GENERAL MEDICINE [1]

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In casting about for a subject to present to this audience, it occurred to me that before a group of professional men, many of them engaged in the various specialties, per-

[1] Delivered October 5, 1928.

haps a greater number engrossed in general practice, it might be well, rather than read a communication on a formal topic, to touch here and there on the high spots of the subject as a whole and to emphasize such features as may prove interesting and perhaps informative to the general practitioner.

That the profession owes much to the urologists is easily susceptible of proof. It suffices merely to mention the tremendous lowering of the mortality rate in prostatectomy, the development and refinement of the cystoscope and the establishment on a sound basis of the value of blood chemistry. The latter, it might be added, was routinely employed in urology before its general acceptance in medicine. When we add to this renal function colorimetric tests, the roentgenographic study of the genital tract, uretero-pyelographic, cystographic and seminal-vesiculographic delineation of these structures with mathematic precision, it is safe to state that urology at least from the standpoint of diagnosis, is within 5 per cent. of an exact science. None excels, and it is doubtful if any branch of medicine equals it in scientific accomplishment in the past decade. Twenty-five years ago when I first entered this field of activity the leaders were men of the broadest culture, possessed of an intellectual accomplishment that it would be difficult, if not impossible, to match to-day. To mention a few: the elder Keyes, Tilden Brown, Bolton Bangs, Alexander, Fluhrer, Hadyn, Morton. These gentlemen, notable for many attributes, possessed from my viewpoint, one outstanding quality—marvelous tactile sense. This because of the fact that many of the procedures now done in the open or under precise vision were in those days closed operations where the slightest error in tactile interpretation might have been a matter of serious import. To-day, because of the striking development of cystoscopic and endoscopic instruments, of instrumental operative procedures with telescopic equipment, with but one or at the most two exceptions there is no reason for performing these procedures without adequate visualization.

Aside from its ever increasing scope the distinction between the urology of twenty-five years ago and that of to-day is one of visualization.

To relate here the many causative factors of pyuria, hematuria, nocturia and so forth, would serve to defeat the purpose of this communication, which is, to stress such important features as have a generalized, and at the same time, practical application. Pyuria may take its origin in the kidney parenchyma, the renal pelvis, the bladder, the seminal vesicles, prostate, Cowper's Gland, the Glands of Littré or the Lacunes of Morgagni. Microscopic pyurias are, to the general practitioner, frequently misleading. Here enters the question of the procedure of the collection of specimens. The first requisite is sterile bottles or test tubes. It is a routine procedure in our office to send only sterile catheterized specimens of female patients. The same practice is carried out in males who have microscopic pyuria and who give a remotely antecedent history of urethritis, or, in whom we suspect a low grade prostatitis. Microscopic study of the prostato-vesicular secretion, together with catheter specimens of the urine, clears the diagnosis of many of these cases. Insurance companies, it seems to me, for the most part overlook this point; many cases are rejected, who after a proper treatment become good risks.

On the question of what constitutes pus in the urine, or where the border line between the normal ends and microscopic pyuria begins, we have no universally accepted rule; some laboratories report any leucocyte observed in the high power field of a centrifuged urine, as a pus cell. This, I consider misleading. Here is what one highly qualified technician said in answer to my question on this matter: "Polymorphonuclear leucocytes are as a *general* rule an *evidence* of inflammation. *A few* polys are always to be regarded with suspicion and the cause for their presence ascertained. A *few mononuclear leucocytes* can be considered normal. *Clumped leucocytes* are always an *evidence* of *pus microscopically.*" Where 7-10 polynuclear leucocytes are present in a 1/12 oil immersion field, it may

then be said that a pyuria is present, even though the remainder of the field is full of blood cells. Clumped leucocytes are, of course, evidence of pus.

Here is another opinion as to what should constitute the requisites in reporting microscopic pyuria. Fifteen c.c. of urine should be centrifuged 5 minutes, the sediment spread out over an area of about 4 square centimeters and the number of pus cells per high power field reported. Leucocytes showing clumping and granular degeneration in the cytoplasm we characterize as pus cells. Leucocytes scattered throughout the field without clumping and showing distinct nuclei in a clear cytoplasm are called leucocytes. Methods of microscopic examination of urine for erythrocytes and leucocytes in urine should be standardized for all laboratories. The occurrence of 5-10 pus cells per high power field in the urine is significant and the cause of this should be determined. A differentiation of pus cells from leucocytes, should be based upon examination of a stained smear of centrifuged urinary sediment. Loose methods of reporting quantitatively the number of pus cells should be discarded and the number of cells in a field seen under the high dry objective definitely counted.

The foregoing, obviously, is a situation calling for correction and definite standardization. Medical men depending upon outside laboratories for this information should be insistent in their demands for precision in reporting such findings. The reaction to litmus of such pyuric urines is of value, inasmuch as bacteria are highly selective as to the media in which they thrive. It seems to me likewise inadequate to have a knowledge merely of the fact that a urine is alkaline or acid. There are times when the degree of alkalinity or of acidity is a matter of considerable moment and inasmuch as these tests are simple colorimetric procedures the quantitative estimation of the alkalinity of a given specimen of urine may prove at least informing.

Urinary Incontinence and Retention

I link these conditions because it has been my observation that medical men frequently misinterpret the one for the

other. In all cases of apparent urinary incontinence and, in fact, in most cases of frequency of micturition in male or female, the residual urine should be estimated. If there be more than should be withdrawn at one time, and that is not much, the bladder may then be outlined by palpation and percussion, to give an approximate estimate of the degree of total retention.

Decompression of retained urine is a subject of the utmost importance and one to which a great deal of study has been devoted by urologists during the past few years. Of course, it cannot be accorded proper consideration in the time here allotted, yet it is not too complicated that it may not be boiled down to simple rules. It is for the general practitioner to determine that the patient has or has not residual urine; it should not be his concern how much, at least, by the method of rapid decompression—leave this determination to palpation and percussion, thus conserving your patient. The disastrous consequences ensuing upon rapid or over-zealous decompression of retained urine, should be, but is not always, a sufficient deterrent even to the expert to keep off. Where, however, circumstances or the exigencies of any given case call for gradual decompression at the hands of the general practitioner, the following procedure may successfully carry him over a trying spot. While for the most part many methods of gradual decompression have been suggested, because of their difficulty and complexity, very few of them have been accorded general use. To Dr. Rose, of Cleveland, however, I am indebted for the simplest and at least as effective a method as any hitherto employed at my hands.

Returning from a meeting of the American Medical Association at Minneapolis last June and chatting over the subject with this gentleman, who in my opinion has devoted much study and discriminating thought to the complex physical and neurological problems involved in this condition, I asked him what in his opinion was the nearest to an ideal method of decompression. His answer was "an indwelling No. 6 ureteral catheter and at the same time

giving the patient enough fluid intake so that the output was maintained just a little ahead of the intake." Since this time we have employed, with a slight difference in procedure, this general principle, with the utmost satisfaction. We have found, however, that a No. 7 or No. 8 French, soft rubber, urethral catheter, in other words, a child's size catheter, has worked out in a gratifying manner. In a few cases, where even a No. 12 or No. 14 French, soft rubber catheter was not tolerated by the patient, the substitution of the much smaller sized catheter just mentioned was borne with the greatest comfort to the patient and satisfaction to myself. It is safe to predict that with the strictest surgical asepsis, general practitioners, where the necessity arises for this procedure, with the same directions as to intake of fluid, may employ this measure with a comforting sense of security. Finally, make this a rule —in all cases of frequency, or urinary disability, male or female, unless there be a specific contra-indication, ascertain whether residual urine exists or not, and if you can restrain yourself, do not withdraw more than is sufficient to indicate that there is or is not residual, and if there be residual, complete your education on the subject by palpation and percussion of the bladder itself. *In all supposed prostatics, incontinents, or retention cases,* suspect tabes, test their knee jerks, pupillary reactions, equilibrium, routinely Wassermann all patients, and inasmuch as incipient tabetics are frequently negative to Wassermann they should, when under suspicion, have spinal fluid examination. This is not anybody's job, simple as is the procedure; select the individual whom you would have do it on yourself—if you'd *have* it done on yourself. Incidentally it is better to drop the term "Wassermann" as the latter carries considerable significance to the lay public. We like the term "Kahn Test." (Not original with us).

Prostatic Surgery

The time for prostatic surgery is when an individual in the prostatic age manifests an appreciable degree of dif-

ficulty in the act of micturition, together with night frequency, with residual of 2-3 ounces; and when these clinical manifestations fail to yield promptly to the ordinary conservative measures. My colleagues will tell you that I am a confirmed conservative, but, if a continuous experience since 1901 has taught me anything, the lesson I have learned is, do not putter or procrastinate with a well established prostate. If you do, it will continue to grow and spread out in business and it will be bad business for your patient. To massage a true hypertrophied prostate is some degrees worse than taking money under false pretences. Surgery of the prostate, however, does not of necessity imply prostatectomy; it may mean the simple intra-urethral removal of a segment on the floor of the prostatic ring. I will later visualize this procedure. (Considerable success has attended the use of burning a channel through this bar by means of a diathermic or endothermic electrode, but in my hands the visualized punch procedure to be later described has given me, at least, the greater satisfaction.) Let me emphasize, lest it be forgotten, that while there are a number of advocates extending the field of usefulness of this step to adenomatous prostatic intrusion, my experience to date has not justified its extension or its application beyond that of the fibrous prostatic bar or so-called collar type of prostate. It is quite possible, however, that because of the notable recession in size of an enlarged prostate following a punch operation, this step may eventually when employed sufficiently early, prove a veritable boon to prostatics.

Prostatic hyperplasia is a highly disorderly process, one lobe may enlarge to the exclusion of the other, or they may enlarge simultaneously if in different degree. Remember, too, that digital examination of a prostate tells but part of the story. One should bear in mind that this organ enlarges in one or all of three directions—intravesically, intra-urethrally, and intra-rectally. With this in mind one may not conclude because of the fact that there is no manifest intra-rectal encroachment that the prostate is not an obstructing one. Digital examination in carcinoma of

the prostate, it should be noted, is most informing, as its earliest manifestations are there.

Nocturia

For the proper recognition of the underlying factors in nocturia or night frequency many things are to be considered. At the beginning the observer must note whether it is a polyuria, meaning a large increase in the volume of urine necessitating frequency of micturition, or, an irritative nocturia; by that I mean a localized irritative condition. Whether it be a general constitutional or a local urological one. To this end twenty-four hour total volume urine is necessary, the amount voided at each act of micturition, the specific gravity, the comparative diurnal frequency, the presence or absence of residual urine, the most painstaking history, a complete physical, a quantitative diurnal as opposed to the quantitative nocturnal nitrogen urine output. If this data is not productive of diagnosis a complete instrumental urological survey with colorimetric tests, biochemical studies, etc., is the rule.

It has been previously claimed here that urology is within 5 per cent.—let us say to be liberal, within 10 per cent.—of exact diagnosis. Well of this percentage of failures in early diagnosis 80 per cent. are women. If an urologist cultivates an exaggerated ego, a half dozen consecutive cases of women in middle or later life suffering from micturitional frequency, urgency, dysuria, nocturia and so forth, will quickly deflate it. I know they have helped me retain my innate modesty. Years ago from sad experience I learned the importance of estimating residual urine in women, something urologists are apt to overlook. It has been my experience in many of these cases after most complete examinations, to find myself at a loss to account for the severity or the persistence of symptoms in women of this type. Whether obscure bladder ulcers, equally obscure abnormal narrowings or angulations of the ureters as I suspect, is the underlying cause in a considerable number of cases, I cannot at this time with sufficient assurance determine, but that they are difficult to a degree, I will

freely concede. Inasmuch as many of these women are at or about the period of menopause it is highly probable that this interposes a not inconsiderable factor. Such cases impress the urologist with his lack of foresight in neglecting the study of psychiatry. Occasionally a mild and easily overlooked urethral lesion may be the only demonstrable cause. Not infrequently a very small caruncle, when removed, results in the complete disappearance of these unpleasant manifestations. A case of urethral diverticulum was discovered only after five or six instrumental examinations. This woman, a young married subject, was incontinent only on walking. The mechanism was that in the act of micturition the diverticulum filled and this sac emptied itself external to the sphincter under activity. It is quite evident, therefore, that we have much to learn about this interesting, if perplexing, phase of urology.

Hematuria

Hematuria refers to bloody micturition. Blood in varying amounts, microscopic and macroscopic, in a voided specimen. While in pyuria catheterized specimens are the rule, in hematuria voided specimens are customary practice. The presence of blood is determined by its gross physical aspects, microscopic study, and chemical tests, such as benzidine. The intensity of the bleeding is determined by the density of coloration and character of clots. In massive hemorrhage one should never forget palpation and percussion note of bladder. This latter step sometimes tells the whole story. In the non-retention type the quantity of blood lost in a given specimen of urine may be estimated by the following test, worked out at my suggestion in our laboratories at the Post Graduate by Dr. John A. Kilian. To the best of our knowledge this procedure has not hitherto been employed clinically. It is as follows: Determine colorimetrically the amount of Iron in the urine —as the percentage of Iron in Hemoglobin is 39 per cent. and the Hemoglobin about 15 per cent. of whole blood, the calculation is a simple one. The entire procedure requires about 15 minutes.

Constitutional tests, hemoglobin, red cell count, blood clot time, general aspect of the patient are all to be considered. Careful history, physical examination, blood chemistry, blood pressure and so forth, will help the practitioner or specialist to determine whether one is dealing with a so-called medical or surgical hematuria. From a symptomatic standpoint and as an aid to interpretation of the etiology, the various types of hematuria should be noted. Remember it is not enough to say that a patient has hematuria. One should, because of its significance, know that it is an initial, a terminal or a total hematuria. This knowledge frequently leads one to the diagnosis. Pain and the effect of movement should also be carefully noted for the same reason.

Management: The first reaction of the medical observer to the presence of hematuria in a patient is or should be, that it is in effect nature's call for help and should the doctor neglect its warning he is patently derelict; secondly, inasmuch as most hematurias are intermittent it is dangerous practice to assume that the administration of the customary medication has in any manner been instrumental in effecting a cessation of bleeding. The records of any urologists will show that with few exceptions hematurias are referred to them with histories of blood in the urine any where from six months to several years and because of this neglect, largely chargeable to the general practitioner, many valuable lives are lost. Then too, many medical men and women erroneously believe that it is unwise to submit their patients to cystoscopic study during the period of hematuria. This misconception may result in first, a lost opportunity on the part of the urologist to visualize at once the source of the blood, a knowledge of which is of much value in directing his later studies of the case; or, secondly, when the urine clears the patient as a rule experiences an increased sense of well being, with diminished apprehension and an accentuation of the natural repugnance to instrumental study. The significance of this to the physician and his charge is too self evident for comment.

Under the heading of bio-chemistry I will quote Dr. John

A. Kilian, Professor of Bio-Chemistry of the New York Post Graduate Medical School. He states: "The majority of clinicians know that renal impairment leads to a retention of nitrogenous waste product, urea, uric acid and creatinin in the blood. It should be emphasized that for the mild or moderate impairment of renal function in an ambulatory case, more valuable information can be obtained from the renal test meal so-called, as differentiated from ordinary urine or colorimetric examination. This consists of a comparison of the volume of urine, the total nitrogen and chlorides excreted during a 12-hour night period from 7 P. M. to 7 A. M., with the volume of urine, total nitrogen and chlorides excreted during the 12-hour day period, 7 A. M. to 7 P. M., when the patient has been indulging in his customary diet and usual routine of duty. With normal renal function the amount of nitrogen and chloride of the day period is twice that of the night period. However, with impaired renal function the nitrogen and chloride excretion of the night may equal or even exceed that of the day period. In this increased excretion of nitrogen during the night the body gets rid of the waste accumulated during the day, so that there results no nitrogen retention in the blood. *Considered purely* from the standpoint of the common method employed in the estimation of renal function by the use of phenolsulphonephthalein, much confusion has resulted and many inaccurate diagnoses given. These results have not always been in conformity with the true clinical condition. One reason for this is demonstrated by the fact that some of the phenolsulphonephthalein is metabolized in the body. Crowell, an urologist, by the way, has recently modified this test by collecting urine specimens every 30 minutes and of these specimens determining the total output of dye. This also emphasizes that what we really should be interested in is *not the total output in a given number of hours*, but rather the period of maximal output in the first 30 minutes, as here with normal renal function one should obtain the maximum. A delay of maximum excretion to the third or fourth half hour indicates impairment of renal

function. Experience with this test has demonstrated to us its practical value, particularly in those cases of mild renal impairment showing no chemical changes in the blood. It is an accepted fact that with progressive impairment of renal function there is observed a definite sequence of retention of the nitrogenous waste product, *first uric acid, then urea* and *finally creatinin.* An increase in blood uric acid is frequently interpreted as an indication of the initial stages of renal impairment. Great care should be exercised in this interpretation because there are other factors entering into this, which time here does not permit to elaborate. Liver functional studies are growing increasingly important in the accurate determination of renal functional diseases. In all cases with renal impairment showing keto-genesis, or vomiting, the alkaline reserve of the blood plasma should be repeatedly determined. The most practical and dependable means of estimating the alkaline reserve of the blood is by determining the *carbon dioxide combining power of the blood plasma."* Then, too, especially in post-operative urological conditions the haphazard administration for any considerable period of time of alkaline or acidulated fluids without regular check-up of the CO_2 combining value of the blood of these patients is not devoid of danger. I have seen patients thrown into conditions of threatened alkalosis or acidosis by the failure to observe this rule. The estimation of CO_2 combining value of the blood in urological cases, especially the graver ones, is to my mind the real outstanding accomplishment in the field of biological chemistry in the last few years. It is something that has not yet come into general use even at the hands of the recognized urological centers of this country. In this connection we have recently added the duodenal tube to our urological armamentarium. By its employment we have been able in a few desperate cases failing to respond to all other measures, to convert these patients into veritable chemical laboratories and have thereby saved a number of lives impossible of salvage by any other method. It has proven in our hands the most effective means of administration of acid, alkalis or other

therapeutic agents for the modification of the composition of blood and in conjunction with grand lavage through this tube we have diminished the nitrogenous blood content in a spectacular manner. It has also been utilized for biliary drainage, which has assisted us in carrying off nitrogenous elements and improving thereby the liver function.

The tendency to acidosis in nephritis can be gauged satisfactorily only by following changes in the inorganic phosphorus of the blood serum. With a rising inorganic phosphorus a fall in blood serum calcium is observed. To avoid a fall in the blood calcium, calcium therapy should be instituted. The efficiency of the calcium therapy can be determined only by a knowledge of the blood serum calcium. Finally your attention is called to the danger from nephritic acidosis by the fall in blood serum calcium to a level below 7 mg. per 100 c.c. of blood. Biological chemistry has given us an insurance policy on our patients, especially in prostatic surgery. It tells us when to lay hands on and when to keep off. It has proven of incalculable value in lowering the previously high mortality rate in this field of surgery, and it is difficult at this time to realize how urological surgery was ever successfully practiced without it.

Acknowledgment is here freely given to roentgenology for its invaluable aid in urological diagnosis. The development of this field of diagnosis has reached such a stage of perfection that no urologist would presume to practice his specialty without a fairly comprehensive knowledge of the subject or at least the collaboration of a qualified roentgenologist. It is my conviction that no examination of a surgical urological condition is complete without roentgenological study.

The brilliant outcome already achieved has by no means been accomplished by roentgenologists unaided. This result has been due largely to the development of the various opaque media at the hands of urologists. The development, however, of uretero-pyeloscopy has not been without untoward incident. In the early days of this work such

media as protargol, collargol, the bismuth preparations were routinely employed and it was soon found that in a considerable number of cases temporary or permanent damage to the extent of complete destruction of the kidneys had resulted Pain and at times violent reactions were pretty generally the rule following this procedure. Fortunately, however, since the introduction of the use of isotonic solutions of sodium iodide 12½ per cent. or even higher, no such outcome is observed to-day. The reason for this, doubtless, is because of the fact that anything used in the renal pelvis should also be a suitable medium for intravenous injection, such as is isotonic solution of sodium iodide. To-day in properly selected cases we anticipate little or no reaction, certainly no reaction of consequence. When gravity is employed for the introduction of this medium, when these solutions are carried in sterile ampoule containers, and not sterilized repeatedly, it is in our opinion a wholly innocuous procedure. Through the employment of this medium by means of the cystoscope we are able to delineate with the utmost precision the renal pelvis, the ureters, the bladder and the seminal vesicles. To-day we will endeavor to show you an improved technique for delineating the latter organs that has not been, so far as we know, heretofore demonstrated. By this method, the seminal vesicles, a hitherto obscure organ is brought out into the searching spot light of orderly scientific scrutiny, by it not only the physical conformation, but also the unmixed bacteriology of the vesicles, as well as the viability of the spermatazoa in its natural habitat, may be determined; and finally in the presence of sluggishly motile or dead spermatazoa it may be possible by direct treatment to remove conditions inimical to their viability.

My auditors may easily deduce from the preceding remarks that an urological survey is by no means a simple procedure. While the cystoscope is undoubtedly the most important of our diagnostic methods, it is but one of a number of procedures and in itself is never completed in one study. But, where a prompt diagnosis may readily be arrived at in a frank case, the border line case, however, fre-

quently involves a serious study over a period of some days.

To my auditors, most of whom have hospital affiliations, I would stress the importance, if you are not already thus equipped, of establishing separate urological divisions in your institutions—that you subordinate, perhaps, some of your preconceived ideas of custom and precedent and realize the irresistible trend of the times and help your separate departments in the cultivation and development of these highly exacting specialties, such as is urology.

To the educator who still considers urology as one of the minor specialties, I would suggest that he is thinking in terms of the very brilliant, but equally dead past.

ARTHRITIS AND OLD AGE[1]

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Old age usually brings with it various uncomfortable ailments, and one of the commonest of these is some form of chronic arthritis. With the advancing years a certain amount of bony and fibrotic change appears to be almost a physiological process—certainly it is a process from which no elderly person escapes. Watch any man of 65 or 70 swing a golf club; the shortening of the arc of the swing is sufficient evidence that the joints of the shoulder and wrist, to say nothing of the lumbar spine, are no longer capable of that wide excursion of movement which characterizes youth. At three score years and ten, radiographs of the joints show more or less new growth of bone around the articular margins, which in itself puts a check on extreme flexion or extension. In addition to this, there is thickening and contraction of the joint capsule and surrounding ligaments. It is safe to say, therefore, that in old age the joints, like other parts of the human machine, show the effects of the wear and tear of living. The joints which have been subjected to the most use are the ones

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which show the greater damage. Furthermore, like other degenerative changes, the arthritis of senility is more conspicuous in some individuals than in others. When these senescent changes become so marked as to cause symptoms, the condition is spoken of as "degenerative arthritis" or "osteoarthritis."

Nearly all careful students of arthritis agree that chronic arthritis manifests itself in two forms which can readily be distinguished pathologically and clinically, and which appear to be of entirely different etiology. The first type is variously referred to as exudative, atrophic, infectious or proliferative arthritis; the second type, as degenerative, hypertrophic or senescent arthritis (osteoarthritis).

Of these two groups the second or degenerative type is by far the commoner in elderly people. Indeed, it is essentially the arthritis of old age and is almost never seen in patients under forty-five. Before proceeding, however, to a discussion of the various forms of degenerative arthritis, it is necessary to refer briefly to infectious arthritis and its relation to old age.

Infectious arthritis usually makes its appearance in early adult life, but it may occur at any age. I have recently seen a case of infectious arthritis which began to develop in a woman in her 71st year. Pathologically, infectious arthritis is inflammatory arthritis. The joint is swollen, and when opened the articular surface is partially or completely covered with granulation tissue which binds the opposing articular surfaces together. This new growth of inflammatory tissue may cause only a shrinkage in the size of the articular cavity, but in advanced cases it completely obliterates it. The capsule and periarticular tissues are also thickened, due to the infiltration of serum and cells. As time advances, fibrous changes occur which lead to ankylosis and deformity.

In America most of us have accepted the teaching of Billings and his school, that infectious arthritis results

from some primary focus of infection, though European students of arthritis think that focal infection has been tremendously overstressed in America. I believe that anyone who will study infectious arthritis in its early stages, that is, at the stage where it presents itself in the outpatient clinic, will be forced to accept the theory of focal infection. In its earlier stages, infectious arthritis is nearly always associated with a focal infection or at least with a history of focal infection. The removal of such foci in the course of the disease usually leads to recovery from the arthritic symptoms. The point that many have failed to grasp is the importance of attacking the disease and the primary focus before it becomes well established in the joints. I will hazard the statement that if the original focus of infection is removed during the first six months of the disease, the patient will recover in a high percentage of cases.

Our studies at the Cornell Clinic have indicated very clearly that focal infection as it occurs in chronic arthritis shows a definite relation to age. In an analysis of 200 cases of chronic infectious arthritis, the average age of onset in patients with infected tonsils was 30 years, whereas in those with dental infection the average age of onset was 42 years. These figures corroborate the clinical observation that infectious arthritis in young people is associated with diseased tonsils, while in old people the focus is more apt to be located about the teeth.

The streptococcus has long been suspected of being the exciting agent of chronic infectious arthritis, largely because it was found with such regularity in infected tonsils and teeth. However, the streptococci were equally abundant in normal tonsils, and furthermore, various types of streptococci, including the viridans, the hemolyticus and the indifferent type, were all equally well represented so that it was difficult to say which type was the infecting agent and which were merely harmless parasites. Finally, efforts to cultivate a streptococcus from the infected joints themselves have been almost universally negative.

During the past two years, we have been making a bacteriological study of patients suffering from chronic deforming arthritis, giving special attention to cultures from the blood and joints.

By means of a special blood culture technic, the most important feature of which was long incubation, we have been able to cultivate an atypical form of streptococcus directly from the blood stream in a surprisingly large number of patients with chronic infectious arthritis of the variety usually referred to as rheumatoid arthritis or arthritis deformans. Patients who show streptococci in the blood have in a large percentage of cases presented swollen fusiform fingers with swelling of one or more of the other large joints in the body. In advanced cases the swelling was associated with more or less deformity and ankylosis. In 56 cases of chronic infectious arthritis with swelling, 38, or 68 per cent., showed at some time or another astreptococcus in the circulating blood. These streptococci present similar cultural characteristics, and Dr. Edith Nicholls who is collaborating with me in this work, has found that a high percentage of them cross-agglutinate. In 43 control cases, blood cultures without exception yielded negative results. Cultures from affected joints were made in six cases. In two of these, the material cultured was curetted from the head of the femur; in the remaining four, it consisted of excised synovial membrane. It is interesting to note that the cultures from the four synovial membranes were sterile, while in the two cases that had cultures taken from the bone itself, a streptococcus was isolated and in both instances the streptococcus recovered corresponded culturally and biologically with the streptococcus which had been previously cultured from the patient's blood stream. Enlarged lymph nodes were also cultured from two patients suffering with chronic deforming arthritis, but in neither case was a streptococcus found. These streptococci, when injected into rabbits, frequently produced a non-suppurative arthritis, and furthermore, in those rabbits that developed arthritis, a streptococcus could be recovered from the

blood stream. This work has not yet been completed, but evidence so far obtained tends strongly to confirm the theory that chronic deforming arthritis is an infectious disease, usually caused by a particular strain of streptococcus. Of course, almost any of the streptococci can produce an inflammatory condition in the joints, but typical arthritis deformans appears to be caused, certainly in a great majority of cases, by a specific type of streptococcus intermediate between the viridans and the hemolyticus.

Clinically chronic infectious arthritis manifests itself as a migratory polyarthritis which is characterized by swelling, pain and stiffness of the joints affected. The swollen fusiform finger joint presents a typical lesion that sooner or later makes its appearance in nearly every case. These patients are almost always afebrile. The most striking symptoms are loss of weight and strength and secondary anemia. In young people the constitutional symptoms are more marked than in the aged. On the other hand, old people appear to have more difficulty in throwing off the infection.

Degenerative arthritis, as stated above, occurs much more frequently in middle-aged and elderly people than does infectious arthritis. Indeed, degenerative arthritis might be called essentially the arthritis of old age, just as infectious arthritis is essentially the arthritis of young adults.

In discussing the morbid anatomy of degenerative arthritis, it seems fair to draw an analogy between this condition and arteriosclerosis. Both appear to be degenerative processes which are the result of wear and tear on highly specialized tissues. In arteriosclerosis, atheroma, fibrosis and calcification replace the delicate endothelium and muscular coats of the blood vessel. In degenerative arthritis the velvety cartilage wears away and is replaced by dense new bone. The synovial membrane becomes thickened and fibrous. Changes in the synovial membrane appear to be secondary and due to trauma from the bony deformities.

The etiology of degenerative arthritis, like that of arteriosclerosis, is not known. Certainly it is not a true inflammation, as there is never at any stage a formation of granulation tissue. Perhaps the most important predisposing factor in the etiology is old age itself. As the years advance, the wearing quality of the joint is diminished, depending perhaps upon insufficient local circulation. Just as the teeth wear down in elderly people, so the joints, particularly the weight-bearing joints, are prone to wear out as the years advance.

Next to age, the most important factor is trauma. Some form of trauma can be demonstrated in nearly every instance and is usually of a chronic nature. Overweight undoubtedly plays an important part in the etiology of degenerative arthritis. In obese patients the weight-bearing joints are the ones that suffer first, and we naturally infer from this that it is chiefly the strain and trauma to the joint resulting from the overweight that affects the joints unfavorably. Faulty posture predisposes to arthritis by bringing about unequal pressure on the joint surface. Incorrect sitting or standing puts constant strain on the lower spine, just as an improper gait places a tension on the joints of the leg, particularly on the knees, ankles and feet. Obese patients nearly all have a bad posture.

Occupation has an important bearing on the etiology of degenerative arthritis. Laborers and mechanics are most often affected. Any joint which is subject to constant usage is apt to show symptoms in elderly patients. Physical defects, such as curvature of the spine, subluxation of the sacro-iliac joint, flat feet and old fractures involving the articular surface of some joint, all predispose to degenerative changes in the joints affected.

Degenerative arthritis occurs in several clinical forms. The simplest and perhaps the commonest type is the so-called Heberden's node. The female appears to be more susceptible to this type than the male. Heberden's nodes begin to manifest themselves in middle life as bony outgrowths around the bases of the terminal phalanges.

Charcot classified Heberden's node as a form of osteoarthritis, but Stockman, who has investigated them thoroughly, states that in all cases studied the joint remained intact. The cartilage was normal in appearance and there was no absorption or fibrous metaplasia of the subchondral bony trabeculae.

The cause of Heberden's nodes is not known. There is every reason to believe, however, that trauma plays an important part in their production. They are closely related to age, rarely making their appearance before the 40th or 50th year. There is no reason for supposing that they are infectious in origin.

Heberden's nodes develop slowly and cause little inconvenience, rarely interfering with the normal movements of the joint, unless they reach a large size. They may be entirely free from tenderness and pain. Usually, however, in the early stages, they are tender on pressure and cause some limitation of movement. As time goes on, they become very hard and painless. Heberden's nodes must be distinguished from the tophi of chronic gout, with which they might easily be confused. Heberden's nodes are directly connected with the bone, while the tophi of gout can be moved slightly over the surface of the joint.

Morbus coxae senilis is another form of osteoarthritis which comes on in middle or advanced age, attacking the hip most frequently, but sometimes involving the shoulder or knee. This form of arthritis usually occurs among laboring people and in contradistinction to other forms of arthritis, is seen more frequently in elderly men than in elderly women. The pathological changes are similar to those seen in other forms of degenerative arthritis, but are apt to be more extensive. The new formation of bone, both around the rim of the acetabulum and about the head of the femur is often marked. This form of osteoarthritis is perhaps more directly related to trauma than the other types. In most cases the disease affects one hip. Occasionally, however, both hips are implicated and in rare instances one hip and one shoulder or knee are affected in

the same patient. Osteoarthritis of the hip is very prone to develop in a middle-aged man after any injury, particularly a fall which strains the hip joint or fractures the head of the femur. There is no evidence to support the idea that typical morbus coxae senilis is infectious. Infectious arthritis may of course attack the hip joint, but when it does, the pathological and clinical features, as well as the X-ray findings, are quite different from the lesions seen in osteoarthritis.

The patient with morbus coxae senilis complains of pain in the distribution of the sciatic, obturator or anterior crural nerve. In the later stages the pain is often definitely related to the hip joint and also to the knee joint on the same side. The pain is at first slight and of a dull character, but increased by movement of the limb. The patient walks with a limp, with his weight on the unaffected side. The foot on the affected side is everted and there is a compensatory tilting of the pelvis and scoliosis of the spine.

There may be some atrophy of the muscles of the thigh, but wasting is never marked because the joint never becomes completely ankylosed. On movement of the joint, crepitation is readily made out. Movement of the joint is limited in all four directions.

Morbus coxae senilis will rarely be mistaken for tuberculosis of the hip, because of the difference in age incidence of the two diseases. It is quite possible, however, to confuse it with infectious arthritis, particularly when the latter condition attacks only the one joint. This, of course, is quite unusual, so rare in fact that on approaching a case of monarticular arthritis in an elderly patient the presumption should be that one is dealing with degenerative arthritis, until it is proved otherwise. We must never forget, however, that infectious arthritis may occur at any age and that while usually polyarticular, it may affect only one joint. I recall a case that confused us somewhat at the clinic. The patient was a middle-aged man with a long-standing arthritis of the hip joint. The diagnosis of morbus coxae senilis was made by the examining physi-

cian. On careful questioning, however, it appeared that he had had a mild polyarthritis several years previous. The symptoms had disappeared from the other joints and persisted in the hip joint. The infectious nature of his trouble was proved by the finding of a streptococcus in curettings from the joint at operation and a similar type of streptococcus was isolated from his blood stream.

Arthritis of the Menopause

Arthritis of the menopause is a chronic polyarthritis of middle-aged women, usually of an obese type, occurring at or just after the menopause, and characterized by degenerative changes in the cartilage and bone of the articulating surfaces. Clinically the symptoms are persistent stiffness and pain in the joints, the knees and fingers being most frequently affected. As a rule there is little or no swelling of the periarticular tissues.

Arthritis of the menopause is the commonest form of degenerative arthritis. It has been one of the most frequent types of chronic arthritis encountered in the Cornell Clinic. Of all the female patients with arthritis admitted to the clinic, one third fell into the group of menopausal arthritis.

Arthritis of the menopause occurs chiefly in middle-aged or elderly women, but it is also encountered in younger women who for some reason have undergone an artificial menopause.

Like other forms of degenerative arthritis, the exact etiology of this particular type is not known. In the Cornell Clinic series, however, reported by Cecil and Archer, 86 per cent. of the cases occurred either immediately after the menopause or within two years thereafter. Only 14 per cent. developed before menopause, and in these cases the symptoms of arthritis preceded the change of life by only a short interval.

Next to its association with the menopause, obesity is the most frequently associated condition. The average

weight in our series of 50 patients was 182½ pounds. In a few patients the weight showed little or no increase, so it may be assumed that while obesity plays an important part, it cannot be looked on as an adequate explanation of the whole picture.

Trauma is undoubtedly an important factor. The condition is much commoner among working women than among the well-to-do. Most of our clinic patients were housewives, accustomed to doing their own work, even to the extent of washing their own dishes and clothing.

In our investigations of menopausal arthritis, focal infection appeared to play a very minor part. Infected tonsils were rarely encountered, and many of the patients had been without teeth for years. Leukorrhea was frequently present, but appeared to bear no relation to the disease.

The morbid anatomy of menopausal arthritis has received practically no study. Judging from the X-ray, the findings are similar to those in other forms of degenerative arthritis. Radiographs of the knee joints, for example, show distinct lipping of the head of the tibia and to a less extent of the condyles of the femur. The spongy bone shows some rarefaction, but the hypertrophied portions are denser than normal. English investigators state that the synovial membrane is thickened and villous.

Clinically, menopausal arthritis presents quite a characteristic feature. The onset is insidious, the first symptom as a rule being a slight stiffness in the knees, particularly when ascending or descending stairs or when arising from a chair. The pain and stiffness gradually become more and more marked and the patient experiences discomfort in walking or bending the knees.

One of the most conspicuous characteristics of this disease is its persistent localization in the knee joints, differing in this respect from chronic infectious arthritis, which is more apt to shift from joint to joint. In 84 per cent. of our cases, the disease made its first appearance in the

knees. Occasionally, however, the stiffness is first noted in the fingers or back, and the knees are involved later on. In 74 per cent. of our cases, the patient suffered from more or less stiffness in the fingers, due to the presence of Heberden's nodes on the distal phalangeal joints. In a small percentage of cases there was pain in the feet or in the lumbar spine.

On physical examination the patient usually presents the appearance of robust good health in contrast to the victim of infectious arthritis, who is usually pale and thin. As stated above, obesity is present in a large percentage of cases. The posture is bad and flat feet are a common complication.

The large joints show comparatively little on physical examination. This is partly due to the obesity of the patient. In thin patients the knees appear more prominent than normal, owing to hypertrophy of the heads of the bones. On flexion a certain amount of crepitation is evident, but actual limitation of movement is unusual. Heberden's nodes are noted in a high percentage of patients. In cases of long standing the physical signs are more marked. The synovial membrane of the knee joint becomes more thickened, grating is more marked and tender points can be brought out on palpation. The synovial fluid may be increased in amount. Heberden's nodes become larger and take on a bony structure, finally causing some deformity of the terminal phalanges.

Menopausal arthritis, like other forms of degenerative arthritis, runs a sluggish chronic course. The progress of the disease is much less rapid than that of chronic infectious arthritis. Sometimes the morbid changes seem to stop short, but usually there is a very gradual increase in the symptoms, due to the increasing irregularity of the articular surfaces. The course of menopausal arthritis is unfavorably influenced by trauma and by hard usage. On the other hand, if the cause of the disease can be removed before great changes have taken place, the symptoms may

in large part disappear, and the joint return to almost normal function.

One other form of degenerative arthritis should perhaps be mentioned, though it overlaps with the others. In very old people there is a *senile* type of degenerative arthritis which is polyarticular and appears to be a more or less physiological process. In 17 cases studied at the Cornell Clinic, the average age was almost 68 years. It may occur in almost any joint of the body, but it is particularly common in the spine, fingers and large joints of the upper and lower extremities. The lesions, as in other types of degenerative arthritis, consist largely of a new growth of bone and cartilage around the articular surfaces, but as in other forms of degenerative arthritis, ankylosis does not occur.

Clinically the patient is conscious of stiffness and more or less discomfort in the joints, particularly on arising and on damp days. With use, however, a certain amount of the stiffness disappears.

Before discussing the treatment of arthritis something should be said about spondylitis. Spondylitis, like other forms of polyarthritis, occurs in two forms, infectious and degenerative. Infectious spondylitis is seen in young people with foci, usually in the tonsils or teeth. Degenerative spondylitis is a part of old age. In the infectious type ankylosis, terminating in a poker-spine, is a frequent end result. In the degenerative form, the intervertebral joints become locked because of the new growth of bone, but do not actually ankylose.

Treatment of Arthritis

The rational treatment of chronic arthritis in old people will depend in great measure on the type of arthritis from which the patient is suffering. If the patient has chronic infectious arthritis with migratory swelling and deformity, an immediate search should be made for a focus of infection, and unless age is a contra-indication, the focus

should be removed. Old age is no longer a contra-indication to tonsillectomy, provided the heart, lungs and kidneys are in good condition. In our experience, however, it is the teeth more than the tonsils that need attention in patients past fifty. If there are several infected teeth, it is better to remove only one or two at a sitting.

Time does not permit us to go into the details of physiotherapy, vaccine therapy and climatology. Once the foci have been removed, I believe that both physiotherapy and vaccines have their place in the treatment of chronic infectious arthritis. The vaccine should be prepared, if possible, from streptococci isolated from the focus of infection. During the past year we have been limiting our vaccine work to streptococci obtained directly from the blood or the joints. In this way we are fairly sure that we are working with the right organism.

In degenerative arthritis the therapeutic problem which presents itself is quite different. Focal infection plays a secondary part. The real problem here is to relieve the affected joints of strain and trauma. This means reduction in weight, correction of deformities and bad posture, possible change of occupation and rest of the affected part. Relief from strain may be obtained by an elastic bandage or in severe cases by some kind of splint. Whereas in infectious arthritis, exercise is found helpful, particularly in a retrogressing infection, in degenerative arthritis rest is absolutely essential. These patients must be cured of the idea so prevalent among arthritic cases that exercise is good for their condition.

Degenerative arthritis as well as infectious arthritis yields to heat, massage and other forms of physiotherapy. Perhaps it would be more accurate to say that the symptoms are relieved by such treatment. The masseur cannot remove Heberden's nodes or spurs around the knee joint by the application of heat and massage, but it must be admitted by even the most skeptical, that heat in its various forms, such as the electric pad, radiant heat, diathermy, etc., gives a great deal of comfort to these patients, par-

ticularly if it is followed by skilful massage. It is very indiscreet on the part of a physician to promise a cure to these elderly patients. He should tell them perfectly frankly that the process in the joint is merely one phase of growing old and that they must learn to adapt their mode of life to the situation. He can promise them relief from pain and considerable comfort if they will follow directions, and these directions should have to do chiefly with the application of heat and rest to the affected part. I often tell my patients that they should live in an atmosphere of heat—warm rooms, warm clothing, warm bed and warm baths.

What shall we say about climate and the various cures? Once the various etiological factors have been determined and the necessary corrections made, both types of arthritis, that is both the infectious and the degenerative, are better off in a warm dry climate. New Mexico and Southern California offer the ideal environment, but unfortunately comparatively few patients are able to make the journey for financial or other reasons. In my experience it has been very difficult to prognosticate about the value of cures. Some patients go to Hot Springs or Mount Clemons and return much improved. Others come back discouraged and a good deal poorer. My favorite of the foreign resorts is Aix les Bains. How seldom, however, we actually witness a complete and permanent cure from a sojourn at one of these cures! The patient returns feeling greatly improved and in the best of spirits, but after a few months in the old environment the joint symptoms return. The most provoking and discouraging feature of arthritis is its tendency to relapse. I can recall a number of patients who appeared to be entirely cured of arthritis by a tonsillectomy, but who after a year or two again developed symptoms even though the tonsils had been cleanly removed. No one should ever report favorably on a therapeutic procedure for arthritis until the patients in question have been followed up for at least three years after the completion of the treatment.

In closing, then, we may say that the best friends of the elderly arthritic are rest, heat and aspirin. The orthopedic surgeon can often be helpful in giving support to the joint which is under continued strain. Many of these patients object to bandages and apparatus, and find from experience that rest is more practical than apparatus. Perhaps not the least valuable adjunct is a cheerful and philosophic point of view, which accepts stiff and grating joints as merely one of the penalties for achieving old age.

TRAUMATIC SURGERY AND THE PROBLEMS OF AGE[1]

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That an aged person is a poor physical risk is so axiomatic that no contrary argument is needed, and in no field of medicine or surgery is this truism more applicable than in traumatic surgery.

An old person sustaining an injury apparently superficial or trivial becomes a subject of concern to the doctor because the element of physical and mental shock is a more important factor than in a middle aged or young person. Again the mere matter of placing an aged person in a recumbent position may induce enough pulmonary stasis to cause early fatality. Many of these old people are like a storage battery which each day is able to start the motor and keep re-charging by a not too active turning of the wheels. But like an idle battery, they soon run down if the physical and mental stimulus of their daily duty is interrupted.

Of course in using the terms "old" or "aged" we are thinking in terms of years; but we all know patients of 65 who have the vigor and push and vitality of patients of 45. What then is the aged patient? To me a patient is not as

[1] Delivered October 5, 1928.

old as his arteries, but rather as old as the neck of his femur for with old people that seems a vulnerable part of the anatomy. It has been said by our medical colleagues that "Pneumonia is the natural end of the aged," and paraphrasing that, a surgeon dealing with the aged injured could truly say "Fractured neck of the femur is the natural end of the aged injured."

If we briefly survey the field of injuries, we soon realize that old people, like their juniors, are liable to injury from three main sources; namely, transportation, industry and ordinary pursuits. In olden times, war was the great injury producer. Later, industry with a host of mechanical devices was the chief factor. Still later the railways became the leading source. But now the automobile is the chief element not only in urban but in suburban communities. The World War made of our profession a group of specialists organized to care for the injured. That experience showed how deficient we were in the care and treatment of trauma, particularly in the treatment of compound fractures. The Surgeon General of the Army is stated to have well said that there were hundreds of our surgeons in France who were masters in gastro-enterostomy, but only a few score with equal skill in caring for the wounded. There can be no question that in medical progress, traumatic surgery has lagged while other types of surgery have progressed. Fortunately there has been an awakening because of the increasing frequency of automobile and other accidents, and now most hospitals are being so staffed that the seniors and not the juniors are in charge of this kind of service. We are on the way to recognize that a broken thigh is just as much an emergency as a broken appendix.

In the aeroplane age just appearing on the horizon, the field for traumatic surgery will be still further enlarged, and it does not require much prophecy to predict that the next great advance in surgery will be in the treatment of the injured.

In old people, as in others, wounds, burns, joint trauma and fractures constitute about 75 per cent. of the lesions encountered. Before we discuss any of these let us again remind ourselves that in this group of the aged we must focus our attention on the individual rather than on the injury; we treat the person rather than the part.

Let us not forget two elements in our approach to the aged injured; one, the physical and psychic shock, and two, the lack of what Osler so well called "vital rubber." Thus we start our therapeutic journey with a handicap, and if the old model is to carry through, we must manage to drive with skill, especially when the going is rough and the traffic is crowded. Not too fast nor too slow; at a leisurely gait. Not shifting gears too roughly nor needlessly jamming on the brakes. Coasting when we can, and idling along in neutral when the going is bad. Well, say you, that's all right for the old Tin Lizzie or Old Dobbin, but it does not apply to an old man or an old woman. But, I differ, for after all the human machine responds to the skilled touch, to the firm but gentle hand, to the experienced guide who knows how to avoid the rough places and who is adept in times of physical and mental stress.

Be gentle then with this old model; temper your driving of it to its capacity and humor its special peculiarities which are the outgrowth of years of service.

And now for some familiar precepts in the management of special injuries among the aged.

Wounds

The principle of partial or of delayed suture is most important. It should be axiomatic that every wound not made with surgical intent is already infected and should be so regarded. If this be true, how important it is to adequately sterilize accidental wounds by the liberal but gentle use of soap and water. We should not rely on antiseptics however actively they are recommended or appealingly advertised. We know from abundant experience that each decade reaches a furore for some

special kind of germ killers. The carbolic of the distant past was succeeded by the bichloride of several decades ago. Then in the decade just passed the chlorines were in the ascendant here when they had fallen into disuse in France where they originated.

The Dakin's solution of our day was in effect the Larbarraque's solution employed by Baron Larrey, who was Napoleon's surgeon in the war of 1814. Just now we are in the throes of another era of antiseptics and we are asked to believe that the germs of our generation can be pestered to death by some gay colors. Red seems to be the first on the list, and many a patient comes to us now a medley of an Indian chief and a futuristic nightmare. Some of the profession are seeing red, they are Bolsheviks in their advocacy of this mercurial, forgetting that long ago we abandoned bichloride because it was dangerous as well as useless. This wound rouge, however, has entered the sunset stage also and in a few years will join the oblivion of many less livid hued predecessors.

If we must use an antiseptic, and for first aid I suppose we must, let us stick to iodine or permanganate which have been standard for years.

Soap and water are the best cleansers and we can safely rely on these when they are available. In the aged it is especially important not to use any strong antiseptics.

Next suturing: It is much better to place the sutures and leave them untied until the second or third day, in the interval covering the wound with a sterile dressing. Any infection will develop during this waiting period, and if none appears after this lapse of 48-72 hours, we can have the reasonable assurance that all is well.

If we do suture, let it be loosely and let us always drain. To be sure many cases heal kindly without any such bothersome precautions; that is true, but it is also true that many develop a serious cellulitis. In an old

person neglect of these precepts, even in a simple scalp wound, may convert an incident into a catastrophe.

Burns exact a fierce toll at the extremes of age, and we all of us dread a severe burn in a child or in an old person. The shock is more profound, the reaction is slower, the reparative properties are lessened. We regard burns as wounds due to thermal, chemical or electrical contact. This means that the treatment is in keeping with wound therapy and hence we do not smear on unsterile remnants or discards like carron oil or greasy salves. Nor do we apply an impervious dressing of the paraffine type unless the burn is of a minor grade. There are three stages in the life history of burns or of any other trauma. One the stage of *onset* or the *inflammatory* stage characterized by redness, swelling, pain. Second the stage of *progression* or the *secretory* stage characterized by exudation of serum or pus or both. Third the stage of *subsidence* or the cicatrizing stage characterized by scar tissue formation with or without contractures.

These you say are the stages of any inflammatory process. Yes they are; and because they have phasal manifestations of different sorts at different stages it is important to modify treatment accordingly. Our plan has been to treat the first stage by wet dressings of sod. bicarb. (5-10 per cent.). This is continued usually for 3-4 days. Then a dressing of sterile olive oil and camphorated oil (equal parts) is substituted. At this stage, the exposure of the part to the rays of the sun or to electric light is also practiced. This "Exposure" treatment lessens absorption, promotes exudation and decreases temperature. The final stage is often hastened by covering the area with a dressing of scarlet red ointment, one dram to sterile olive oil one ounce. Continuing the "exposure" method at this stage is good practice.

Now in old persons, shock and pain need prompt attention. We force fluids; we resort to transfusion if needed. Morphine is used often enough to prevent pain, and luminal is used to allay restlessness. At all stages,

we mobilize the parts to avoid postural contractures. We do not favor débridement of the burned area in the aged; and as a matter of fact that procedure has a limited value in patients of any age. The tannic acid method by which wet dressings of this substance are applied is excellent for body burns involving a large surface. This is virtually a method of chemical débridement because the burned area dries up and exfoliates.

Joint Injuries. The penetrating wounds of joints are serious affairs at any age; but in the old patient a septic arthritis is likely to lead to amputation or death. Osteoarthritis activated by injury may become a very difficult problem especially if it affects the lower spine or the knee. The appraisal of responsibility is another matter of importance. For example it is obvious that the osteophytes in this X-ray film are of long standing and that they are evidences of hypertrophic osteoarthritis. This patient, however, says he has never had any pain in his back until he was knocked down by this automobile. How much of his trouble is old, and how much of it is new, and how much of it is chargeable to this trauma? This brings up the whole question of a single trauma, one accident, acting as an aggravating or accelerating element of an old or quiescent ailment. Can a blow on the chest upset the rhythm of an aged cardiac and cause decompensation? Can a minor bruise on the toe of an old diabetic be the cause of the subsequent gangrene and necessary amputation? That patient with established endarteritis of both legs says a recent bump on the shin caused an ulceration that you know may lead to amputation of the thigh. Did it?

Or those cases of malignancy, superficial as well as deep, that are alleged to be solely or partly traumatic in origin. What is to be our attitude as to these?

We approach the solution of these problems by first of all asking ourselves—What usually or ordinarily happens under the given set of circumstances? In other words, we rely on past experience of our own or others.

In answer to this self propounded inquiry we usually find that an injury of the type described has little or no effect on a chronic or latent ailment. If that be true, then we go on to determine whether or not the ailment in question is characterized by periods of accession or remission, and by continued but perhaps unrecognized progress.

In addition we take note of the "time element;" when did this aggravation occur in relation to this injury? From a clinical standpoint is the connecting linkage adequate? Has the progression of the disease been unusual or is the flare of an accepted type?

Finally if there had been no history of injury, is there anything in your present findings that would lead you to suspect something beyond the ordinary signs of the disease in question?

If now you believe the injury did aggravate, accelerate or activate the ancient disease, you must be prepared to estimate the degree and duration of this advancement, for many of these accident cases bring up medico-legal questions. How much deformity; how much disability? In old people this is a difficult matter to appraise because of their inability at their time of life to seek or obtain other gainful employment in the presence of a physical handicap due to injury. Their period of convalescence is necessarily longer and their recovery is less likely to be as complete as in a younger person.

A decision by a physician entails much careful thought and complete knowledge of all the facts in the case. Our own plan is to allot 60 per cent. for *function* perfectly restored, and 20 per cent. each for perfect restoration of *union* and for *contour*. By *function* we mean ability to perform; by *union* we mean the state of repair; by *contour* we mean the external appearance. In other words we judge our end result in measurable terms based on the two essentials of *actions and looks*. They judge cattle or dogs by the same standard of arbitrary values, and I submit that we should be able as physicians to agree on some

set of standards so that our opinions will cease to be individual guesswork. How much better to agree in terms of figures than in terms of adjectives or adverbs. You call the result good; I might call it fair for our standards are not the same and never can be unless we previously adopt the same elements as determinators.

Fractures

Naturally fractures of the lower extremity arrest our attention first; and of these fractured neck of the femur claims first place.

When an old person has a broken bone there are certain important steps in treatment, and these may in part be listed as follows:

(1) *General physique.* Is this particular patient capable of enduring the usual regimen for the injury he has sustained? Can any anesthetic be administered? Is this a case for mobilization or immobilization? Can this patient remain recumbent? Is there any contra-indication to skeletal traction, or to open reduction? Do we here and now resolve to treat the individual and relatively disregard the injury? Let us make no mistake at the outset by rating our patient by the calendar of years rather than by a reaction of tissues. My patient of a year ago with a fractured neck of the femur was by the calendar nearly 92 years old; but she was up and around in a walking calliper 14 weeks after her fall.

(2) *Type of Fracture.* Is it a Type I? That is do the fragments overlap. If so then our plan of treatment differs much from our procedure in a Type II case in which there is no overlapping. There is as much difference in the management of these two types as there is in the management of a catarrhal appendicitis and a ruptured gangrenous appendicitis.

(3) *Surroundings.* Is this patient to be home-treated or hospital-treated?

The psychology of the sickroom is a factor for most patients; for an aged person it may well become one of the deciding factors. There are many spry old ladies of 70 who have never been under the care of a doctor except for a few days at each child birth. They are made up of a combination of rubber and steel springs; they have been present at the birth and death of every grandchild; they are more active than their youngest daughter; they never in their lifetime weighed more than 120; they are the wrens of our practice as compared to the wise owls or old crows.

Put a patient of this perennial flapper type in bed and you by that act lower the morale to a visible degree. By contrast take the fat feeble septagenarian who has lead a sheltered life; who has avoided drafts; who has not ventured out in the night air; who has had a selected diet; who is constantly under the care of doctors. This patient is certainly not the wren type; no, that is a bird of another plumage or vintage—not infrequently a parrot. One of these, with identic injuries, you treat like a doughboy; the other like a decrepit.

Let us be very careful then so to treat the injured part in a way acceptable to the individual patient. Our splintage must not be cumbersome—we will avoid circular casts or casings—so far as possible we will apply only removable apparatus so that these aged tissues may be subjected to frequent inspection.

We will treat more of our fractures of the hip in traction and suspension and far fewer of them in abduction or other plaster of paris casings or casts. To me it seems remarkable that so many of us long adhered to plaster of paris spicas in fractured hips when most of us long ago discarded immobilizing dressings in every other joint because they kept the joint inactive so long and thus retarded circulation and delayed repair and convalescence. Yet the hip, more than any other joint, needs conservation for there is a quadrilateral area of the neck of the femur which when broken never perfectly repairs. It is like

the spinal cord in that respect. This is the area affected in the fractures of the base of the neck, the intracapsular variety. The others, those outside the base, the extracapsular, are in reality high fractures of the shaft of the bone with a prognosis more like shaft fractures.

I am convinced that Type I intracapsular fractures almost invariably repair by a sort of spontaneous reconstruction operation in which the fracture line fades out and the trochanteric line and the anatomical neck blend or fuse. The same thing happens with similar sort of bone as in the body of the vertebra, the os calcis, the lower end of the radius. It is a structural inability to repair; it is cancellous bone crushed and devitalized. In the neck of the femur, this desiccated bone literally stews in its own juice (blood and serum and macerated muscle) in a vacuum under a pressure of many pounds at a temperature of nearly 100°. Is it any wonder that under such conditions the neck disappears in some cases as early as six weeks?

There are then certain rules and regulations governing the management of these aged injured, and of these let us not forget that one of the most important is to individualize our patient in terms of tissues rather than in terms of years.

This patient of 70 may be a better risk after an injury than that patient of 45.

And let us not be too prone to give a poor prognosis just because the patient is closer in years to 100 than perhaps we ourselves will attain.

Some of these old models may not have four wheel brakes, chromium plating, Duco paint or rapid acceleration speed from a standing start. But just the same, this old model has gone many miles and is capable of going many more if not rushed into high speed too often.

Finally, let many of us recall that in a decade or two we also will be in the class of the ancients and then let our

surgeon beware if he would consign us to the incurable list just because we had attained three score and ten, or better four score. A woman may be as old as she looks, but a man is never old until he quits looking.

DISEASES OF THE EYE IN OLD AGE *

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Nearly a thousand years before Christ, a great poet—probably Solomon himself—spoke of Age as "the day when the keepers of the house shall tremble, and the strong men shall bow themselves, and the grinders cease because they are few, and those that look out of the windows be darkened." But age is not always a question of years; for, as Sir Thomas Brown [1] wrote in 1646: "Many grow old before they arrive at age." Twenty years later, J. Small [2] voiced the earnest desire "that Physicians would study the Geroncomical part of Physick more than they do."

Age alone is not sufficient reason for diagnosing an affection as senile. I have seen people over ninety years of age whose eyes, in many respects, were youthful; and, conversely, persons under forty with eye lesions similar to the changes of senescence. Therefore, it is not wise to diagnose an eye lesion as senile until all toxic sources have been excluded. This is especially important because of the lowered resistance in persons of advanced age. In this connection, MacCallum [3] has written the following very significant sentence: "With the advance of age, wasting becomes evident in many organs, if not in all, although the inconstancy with which it appears leads one to wonder whether other factors play a part."

Therefore, I will consider briefly, some of the most important senile changes that take place in the various tissues of the eye; some of the affections arising from these

* From the Johns Hopkins Hospital, Wilmer Institute, Baltimore. Delivered October 12, 1928.

changes; and, where possible, methods to mitigate the lot of the old person with failing sight.

Ocular Changes in Old Age

Eyelids

Hippocrates noted that many old people become "hollow-eyed." In fact, there is a tendency for the whole eye to become smaller in advanced age. The muscles of the eyelids become atonic; the skin smoother, thinner, less elastic, folded, producing concentric lines commonly spoken of as "crowsfeet." At times, the upper lid sags so much that vision is interfered with. The lower lid may turn out (senile ectropion), which leads to degenerative changes in the conjunctiva and a very annoying watering of the eyes. Or, the lid may turn in (senile entropion), causing great discomfort from the inverted lashes, sometimes leading to severe conjunctival inflammation, and even to ulceration of the cornea.

Ocular Muscles

Paralysis of the external muscles has been mentioned by several authors as a senile affection; but, in my experience, it is seldom that this condition is due solely to the changes of age.

Conjunctiva

The thickness of the conjunctiva differs greatly in individuals, and it is much influenced by exposure to irritation and intercurrent inflammations. The aged conjunctiva shows atrophy of the subepithelial connective tissue with hyalinization; disappearance of the elastic tissue fibres; and increased thickness of the epithelium with a tendency to keratinization. Throughout life, the conjunctiva is more exposed than any other mucous membrane; therefore, the palpebral portion assumes a red and velvety appearance from enlargement of the papillae. Concretions of dead epithelial cells and hardened mucus form in the epithelially lined depressions, called the glands of Henle.

These accumulations, "lithiasis," look like calcareous deposits, and they frequently feel so to the patient. The ocular conjunctiva often becomes pigmented around the corneal limbus; on either side of the cornea in the space between the eyelids, it becomes thicker and assumes a yellowish color similar to fat. The pinguecula is due to a hyaline degeneration and a local hypertrophy of the elastic fibres. It is more marked in the case of inflammatory redness of the balance of the conjunctiva; and, occasionally, it is itself the seat of ulceration. In age, the conjunctiva as a whole becomes less elastic.

Tenon's Capsule

Tenon's capsule becomes thicker, less elastic, and infiltrated with fatty masses. (Figs. 1 and 2. Conjunctiva and Tenon's capsule in various decades of life.)

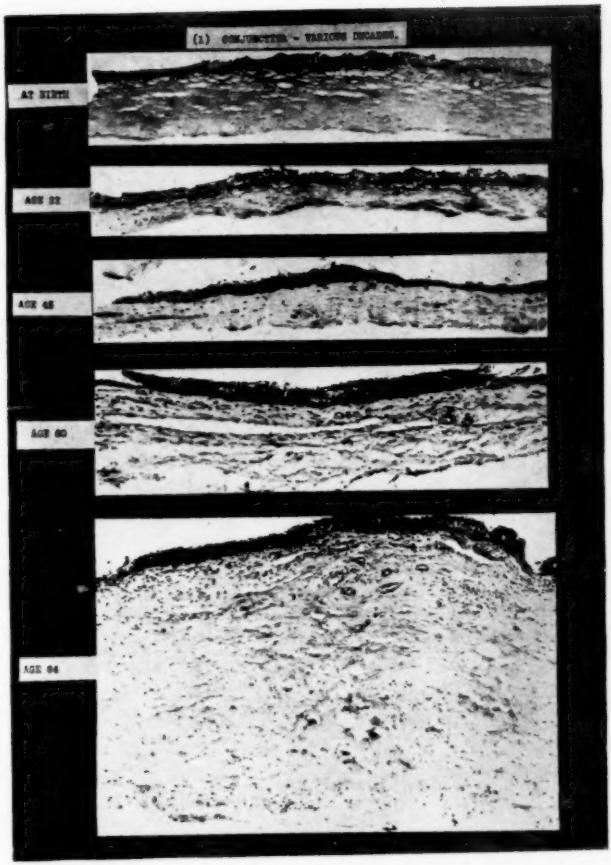
Sclera

The sclera thickens, becomes more rigid and of a yellowish color. In a word, according to Salzmann [4] the whole tunica fibrosa undergoes a certain degree of fatty degeneration.

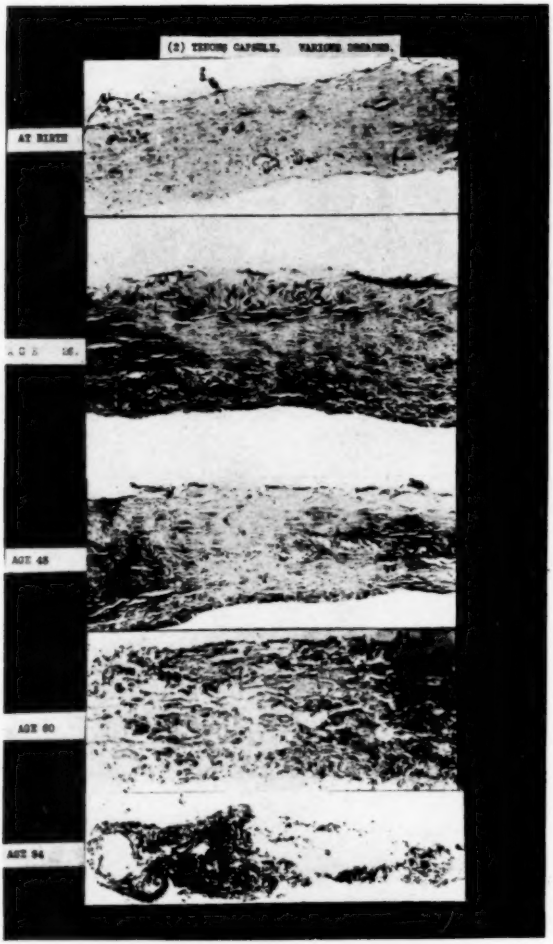
Cornea

The corneal changes of age have taken on a special interest since the introduction of the slit lamp and corneal microscope. The apparent diameter of the cornea diminishes; it loses its lustre and transparency; and, at times, it flattens, particularly in the vertical meridian, with a change in its relative radii of curvature. Astigmatism "according to the rule" tends to decrease; astigmatism "against the rule" to increase; while in emmetropia, slight astigmatism "against the rule" results.

Kistler [5] has shown that, in dogs, as in humans, the refraction of the cornea grows less with age; and Vogt [6] has called attention to the increase in the internal reflection of the cornea at a level with Descemet's membrane.



(1) CONJUNCTIVA—VARIOUS DECADES.

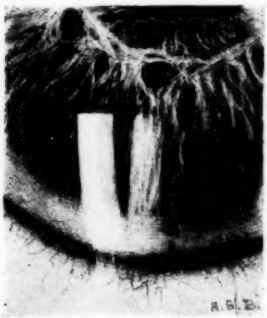


(2) TENONS CAPSULE. VARIOUS DECADES.

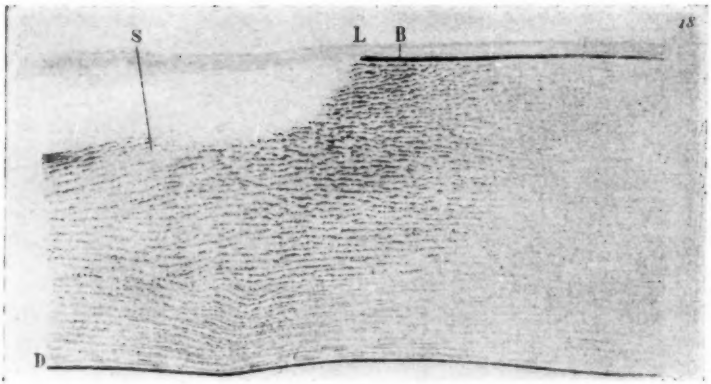
With the corneal microscope, the beautiful mosaic appearance of the endothelial layer becomes less visible; and the cells assume a granular and amorphous appearance. Verrucosities (Hassel-Henle warts) in the periphery of Descemet's membrane, are found in all adults (Vogt [6]). Migrated pigment granules from the iris and ciliary body are seen on the posterior surface of the cornea.

The opaque ring around the periphery of the cornea, called, with poetic license, "arcus senilis" or "gerontoxon," is very interesting. It is more frequent in old age than in youth; but I have seen it very often in persons under forty, when there was some interference with the corneal nutrition, such as "pulsating exophthalmos," etc. This opaque ring is separated from the limbus by a clear band of cornea, because Bowman's membrane, which is always involved, does not extend to the extreme periphery. This clear ring, however, is only superficial; for the opacity, which occupies also the deeper layers, does go to the limbus. The opacity is due to minute oil globules of fatty infiltration. Meesmann [7] suggests that it should be called "arcus lipoides," because a similar condition appears in young people. He further states that it is associated with increase of cholesterin and other lipoids in the blood. He also calls attention to hypercholesteremia in its relation to the lipoids in the walls of sclerosed blood vessels. A. Fuchs [8] mentions the fact that feeding animals with cholesterin, causes a whitish ring around the cornea similar in appearance to the arcus senilis. (Figs. 3 and 4, Arcus senilis.)

Fuchs [9] has described a "senile marginal atrophy (peripheral furrowing keratitis of Schmidt-Rimpler) which sometimes appears as a pure senile change. The opacity becomes broader, and its site in the cornea thinner with a distinct furrow. Under the influence of intraocular pressure, the cornea may yield at the point where it is thinnest, and give rise to true ectasia.



(3) ARCUS SENILIS (Man of 67 years).



(4) Arcus Senilis (Microscopic) X 70 From Histopathology of the Eye.

ADELBERT FUCHS.

Anterior Chamber

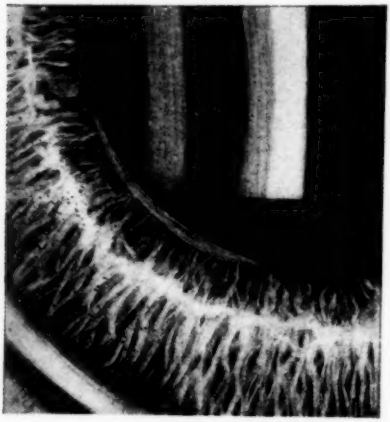
The anterior chamber, which in early life has a vertical distance from the lens of about 2.8 mm. (Salzmann [4]), has a tendency to grow more shallow in senescence. This is due to the flattening of the cornea and the increase in the size of the lens. There is also a decrease in the size of the posterior chamber. The change in the size of the anterior chamber has a marked influence upon the occurrence of glaucoma.

Iris

The iris, in old people, exhibits very striking changes, when viewed with the slit lamp and corneal microscope. There is hypertrophy of the connective tissue fibres, at the expense of the cells (whose protoplasm undergoes degeneration); hyalinization of the iris stroma; sclerosis of the blood vessels with increase of their visibility; and more prominence of the sphincter muscle. In the pigment epithelial layer, there is death of the cells and migration of the pigment granules. These are deposited on the posterior surface of the cornea, anterior surface of the lens capsule, and anterior surface of the iris. By transmitted light, those granules appear like minute, dust-like, particles of black pepper; by direct illumination, like red pepper.

According to Hinen (quoted by Koby [10]), in the fifth decade, the stroma suffers most frequently (55.9 per cent., the border and posterior layer each 9.5 per cent.); in the eighth decade, the stroma and the pupillary margin are affected in all cases, and the posterior layer in about 85 per cent. The pupil border, where the pigment has disappeared, looks homogeneous like a glass membrane (Fig. 5.) The iris, as a whole, becomes thicker and more rigid. From these alterations, the pupils of old people become smaller and less mobile; and the color of the iris, especially blue ones, changes to a lighter hue.

In people over 75 years of age, I frequently find, in addition, the remains of a quiet iritis unnoticed by the patient.



(5) ATROPHY OF PUPILLARY BORDER
(Slit Lamp). 84 Years

Before the days of the slit lamp, this condition was probably often overlooked. Even with our modern aids to diagnosis the study is much simplified by the use of a mydriatic.

Ciliary Body

In the ciliary body, similar degenerative changes take place. The thickening of the connective tissue elements causes an encroachment upon the circumlental space; and influences the function of the processes so important to the nutrition of the lens and vitreous.

Vitreous

According to Addario [11], rarefaction and shrinking of the vitreous fibrillae occur; and Vogt [6] says that the senile framework shows increased luminosity, and that the tunic-like vertical folds are especially visible and bright.

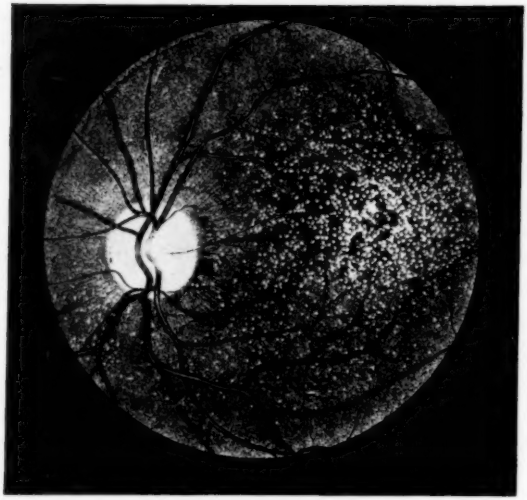
Fundus

In old people, the retina takes on an epithelial character with loss of transparency and lustre; and diffuse, or circumscribed atrophy, affecting the pigment epithelium, gives rise to a tesselated appearance.

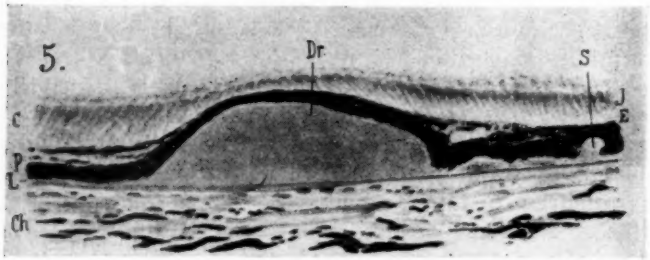
Terrien [12] states that, in old persons, destructive vascular lesions of the retina are rarer than in the vessels of other organs; but he agrees with many observers in regard to the vulnerability of the macular region. Cystoid degeneration of the retina is a common senile manifestation; but this change usually takes place in the extreme periphery, and is of little visual importance. The condition is usually a postmortem discovery.

There is usually sclerosis of the chorioidal vessels, which causes a stiffness and rigidity of this layer. Small warts or verrucae, on the surface of the chorioid, are commonly described as a senile change. It is true that the disturbed vascularity of age does cause them; but they also occur earlier in life under similar nutritive disturbances. To illustrate this, I am showing the fundus picture of a colored woman of 47, who was suffering from a number of bodily ailments. (Figs. 6 and 7.)

In regard to senile central chorio-retinitis, Fuchs [6] says that it occupies a position midway between a degeneration and an inflammation. Many authors (Coppez & Danis [13], Harms [14], Van der Hoeve [15] and others) have described a senile macular degeneration of the retina. De Schweinitz [16] mentions a senescent angiosclerosis of the fundus, which differs from the usual changes of arteriosclerosis by the retention of the regular vessel lumen, and absence of arteriovenous compression, but with a pale disc. In my experience, these changes are much influenced, even in the aged, by focal infections and toxemias. De Schweinitz, with other authors, describes a senile macular affection under the title of "retinitis atrophicans centralis."



(6) Woman, colored. Age 47. Colloid excerescenses of lamina vitrea of chorioid (so-called Druse, Hutchinson's disease, Guttate or Tay's Chorioditis).

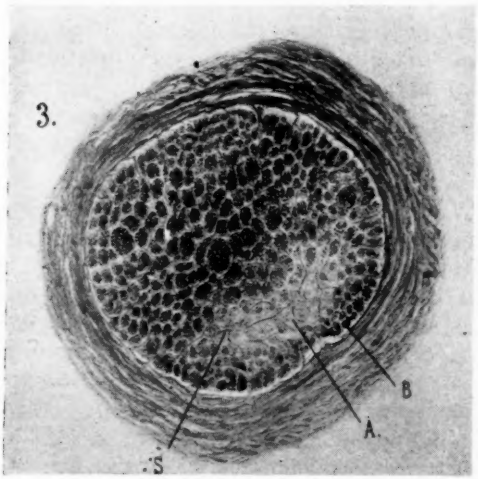


(7) Colloid Excerescenses of Lamina Vitrea (Microscopic) X 250. From Histopathology of the Eye.

ADELBERT FUCHS.

Optic Nerve

In addition to the fundus conditions already described, there occurs more rarely (and not easily recognized) a partial atrophy of the optic nerve. De Schweinitz says there is a "type observed in elderly people characterized by atrophic pallor of the optic nerve, without shrinking, sometimes associated with senile retinal sclerosis." In these cases the central vision may be reduced very little, and the visual fields only slightly contracted. Fuchs [8] says that in such cases, there may be an impairment of vision with very little ophthalmoscopic change. The condition may be due to a blocking of a small nutrient vessel in the nerve, with a localized atrophy. A. Fuchs [8] describes such a case in a man of 70 years. The patient died from leucocythemia and the optic nerve condition was discovered incidentally. (Fig. 8. Illustration from Fuchs' Histopathology.)



(8) Senile Atrophy of Optic Nerve (Partial-Microscopic). X 20. Pal-Weigert Stain. A - Atrophic Focus. From Histopathology of the Eye.

Adelbert Fuchs.

Fuchs [9] has called attention to the fact that a partial atrophy of the nerve may be due to actual pressure upon its delicate fibres by a sclerosed internal carotid, or ophthalmic, artery.

Lens

The senile changes of the crystalline lens, when studied by the aid of the slit lamp, are so interesting that one is tempted to give too much time to this structure.

In general, age tends to produce a shrinkage in the tissues and organs of the body. Quite different from this rule, is the behavior of the lens, which continuously grows larger through the whole of life; the increase in diameter may amount to 1 mm. and a trifle more in thickness. As Salzmann [4] very graphically states: "One can deduce the form of the senile lens from that of the youthful lens if one thinks of it as surrounded by a shell some 0.5 mm. thick." The margins of the lens become more rounded. The cells of the anterior lens capsule are cubical in youth; but later on in life they become flattened out by the pressure of the enlarging lens. They may shrink to such an extent that little more than their nuclei can be seen on the inner surface of the hyaline membrane (Collins & Mayou [17]). This membrane becomes uniformly thickened with minute colloid deposits.

Time will allow the consideration of only some of the more important changes recognized in the living eye by means of the slit lamp and microscope. There is increase in the internal diffuse reflection of light; the surface of the adult (senile) nucleus becomes more marked and its lamellae more distinct; according to Meesmann a buckling forward of the seams of the lamellae causes variously shaped prominences. If the beam of light is thrown in the eye very obliquely it makes more clear the shadows of the protrusions. Similar changes take place on the posterior surface. The lens becomes fluorescent and assumes a yellowish color. This tint becomes so marked in the posterior layer that the beam of light takes on a dark orange hue. The coloration is really greater in the nucleus; but

the light rays reflected from the posterior capsule have to traverse all of the lens to reach the eye of the observer, and each layer adds to the depth of color. By reflected light in the miosis of age, this change give rise to a yellowish gray appearance of the pupil, which might be mistaken for cataract. There is also greater absorption of the spectral colors, particularly the blues and greens, which results in reduction of the normal color perception for the blue end of the spectrum.

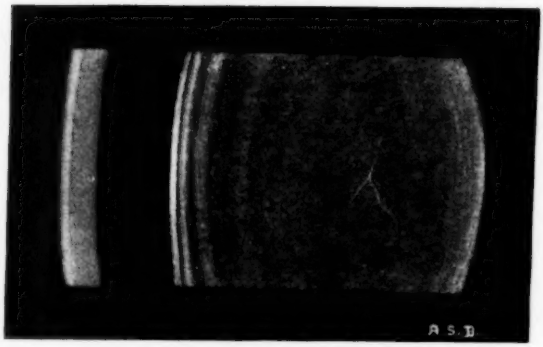
From early youth, the nucleus increases in size and hardness; until in advanced age, as a result of this process of dehydration and sclerosis, the lens is practically all nucleus, and inelastic like old rubber. (Figs. 9 and 10.) As Shakespeare's cynical Jacques says, "and so from hour to hour we ripe and ripe, and then from hour to hour we rot and rot."

Presbyopia

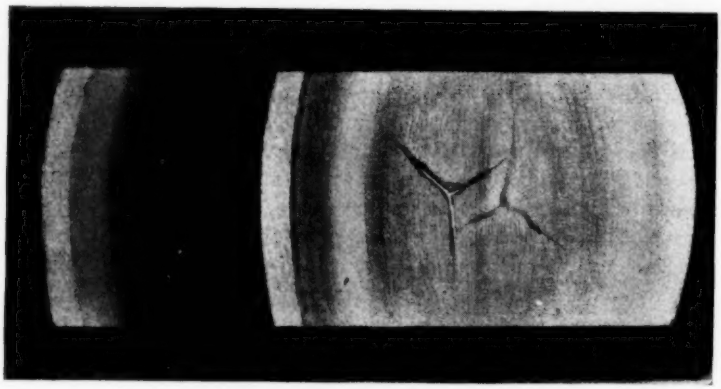
The above described changes give rise to presbyopia, the senile failure of accomodation. This failure is not due to diminution in strength of the ciliary muscle, but chiefly to the inelasticity of the lens and decrease in its index of refraction, supplemented, perhaps, by shrinkage of the coats of the eye, by flattening and lessened refractive power of the cornea, advance of the focus by miosis, etc. In very old people, the lens acquires a double focus; so that the presbyope reads better in a brilliant light owing to the reduction in the circles of dispersion by the contracted pupil, while the reverse is true of the majority of people with cataract who require greater amount of light afforded by a larger pupil. As a precursor of cataract, the index of refraction of the lens is occasionally increased producing "second sight," and allowing the person to lay aside his reading glasses. I have observed this phenomenon in several generations of a family.

Cataract

The senile lens is subject to the development of a great many kinds of opacities—cataract.



(9) CRYSTALLINE LENS OF A BOY OF 10 YEARS.



(10) SENILE LENS (Woman of 71 Years).

When published, the Fourteenth Decennial Census of the United States [18] will state: "After 64, cataract becomes the foremost cause of blindness, being responsible for 34.1 per cent. of all blindness at that time of life." . . . "Almost one-half of the blindness resulting from cataract occurs after 64 and nearly three-fourths after 44, or after the prime of life." According to Vogt [6], "more than 90 per cent. of all individuals over 60 years of age show senile lens changes of various degrees." Jackson [19] found that in 732 patients, over 50 years of age, who consulted him for all kinds of eye trouble, 53.4 per cent. showed lens opacities. From this series with an average of 65.35 years, Dr. Jackson says: "The probability is that under proper hygienic care it will be twenty years before the cataract becomes mature and fifteen years before he loses the power of reading ordinary print." There is a great difference shown by the various types of lens opacities in their tendency to increase. For example, spoke-like opacities in the cortex, tend to increase more rapidly than nuclear ones.

In addition to the lenticular changes mentioned, in cataract there is hydrolysis of the lens protein with the formation of tyrosin and cholesterin.

The most probable cause of cataract, according to Parsons [20], is the nutritive disturbance of the lens due to general faulty metabolism, possibly from the formation of specific autocytotoxins.

Glaucoma

The census report already mentioned, will say: "Glaucoma is also distinctly a disease of later adult life, nearly one-half occurring between 45 and 64." . . . "From 45 to 64 (late middle life) glaucoma percentage increases, more than trebling." . . . "Glaucoma registers a great increase, the proportion in 1920 being nine times that for 1890 and about one and a half times that for 1910 (increase in number of aged in general population)." After thirty, its rela-

tive incidence increases with every decade, and its importance is enhanced by its being a bilateral affection.

Some of the age factors in the development of glaucoma are: the increase in thickness and loss of distensibility of the sclera; enlargement of the lens; lessened size of the anterior chamber, which causes a decrease in the filtration angle and a pressing together of the meshes of the ligamentum pectinatum; sclerosis of the ciliary processes and their encroachment upon the circumlental space. Under these conditions, any further reduction in the filtration angle may induce glaucoma. For this reason one should be very cautious in the use of a mydriatic in old people. In the beginning of senile cataract, there may be considerable swelling of the lens. These changes have been very aptly summarized by Priestly Smith [21], who says that, in some cases, the lens becomes too big for the eye. These senile manifestations are more liable to give rise to glaucoma in the smaller eyes of hyperopes than in others.

There is probably a change in the character of the aqueous in old age, as there is in the secretion of the ductless glands. Perhaps, the decline in the secretion of the suprarenal renders the eye an easier prey to glaucoma. Vasomotor disturbances are of serious import. Some years ago in the course of a few hours I saw two elderly women with acute glaucoma. In one case, the attack was caused by the shock of the announcement of the sudden death of a brother; in the other (a person who was dependent upon clerical work for a livelihood) by the joy of a telegram bringing the unexpected news of a good annuity!

Therapeutics

Drooping of the upper eyelid becomes so great at times, that in reading, the lid has to be raised by the fingers, or by a support mounted on the upper rim of the spectacles. It is easily cured by cutting out a strip of skin as long as the lid, and 4 to 5 mm. wide. A local anesthetic is used, and the wound is closed by a subcutaneous stitch of very fine silk.

Senile ectropion, in mild cases, can be relieved by the simple method of galvano-puncture, as suggested by Ziegler. Strict aseptic precautions, and a local anesthetic should be used. After the eyelid is firmly fixed with a lid clamp, a number of punctures are made on the conjunctival surface, about 4 mm. from the lid margin. I get the best results by placing the punctures very close together (2 mm.). This cauterization is usually sufficient in the relaxed tissues of old people. However, there are a number of more formidable surgical procedures for shortening the lid, which are satisfactory.

In both entropion and ectropion, only the lower eyelid is usually involved Temporary relief can be obtained by the use of collodion or strips of adhesive plaster. For a cure, I will describe a method simpler than a more formal surgical procedure, and one that has never failed when properly carried out. Butyn 1 per cent. is instilled in the lower cul de sac, and the skin surface is anesthetized by the injection of 1 to 2 c.c. of 1 per cent. solution of procain containing 4 minims of adrenalin to the ounce. A stick of caustic potash is sharpened on a piece of wet sterilized blotting paper. After the insertion of a spatula, the skin surface of the lid is cauterized by the caustic pencil with a gentle stroking motion parallel to the lid margin, and about 4 mm. from it. The skin should be perforated, and the width of the cauterized surface may vary from 2 to 5 mm. The caustic action can be stopped, when desired, by an application of a 1 per cent. solution of dilute acetic acid, or by vinegar. During the procedure, the lid returns to its proper position and remains there. The wound may be covered with bichloride salve 1 to 10,000. A bandage is unnecessary. Considerable reaction immediately follows this proceeding; but it quickly subsides under ice applications; the patient is not laid up; and no appreciable scar results. The operation can be used without shock, in the case of very old or infirm people; and it is applicable before a serious intra-ocular operation, when the patient is suffering from the annoyance of the inturning lashes.

Lithiasis sometimes occasions much discomfort, giving rise to a feeling of cinders in the eye. These concretions should be incised singly with a very sharp pointed cataract knife, and the accumulated masses removed by a minute curved foreign body spud. With the use of butyn and adrenalin, the procedure is painless.

Pinguecula in old people does not require treatment, except in those cases where it becomes inflamed or ulcerated. When this occurs, the condition quickly subsides under a simple treatment of irrigations with a 3 per cent. solution of boric acid, the application of ½ per cent. solution of silver nitrate upon a cotton applicator, and the bed-time use of acriflavine.*

Furrowed keratitis, in the aged, is fortunately not very common, according to my experience. But it can be relieved by attention to the general bodily condition; locally, by irrigations several times a day with a boric acid solution, followed each time by the acriflavine. In some cases a pressure bandage between treatments, is helpful.

Iritis

The quiet iritis, so often seen in the aged, requires treatment that does not differ from that used in younger people. But in completing the diagnosis, a mild mydriatic is very helpful. In these cases, and for ophthalmoscopic examinations of the fundus, a 5 per cent. solution of ephedrin is usually sufficient; but a combination of this drug with an equal proportion of a 5 per cent. solution of euphthalmin makes a satisfactory mydriatic. However, in all old people it is wise to contract the pupil after the examination, by a half per cent. solution of pilocarpin.

Retina and Uveal Tract

In the case of lesions of the uvea and retina in old people, it is particularly important to make a thorough survey to exclude all bodily toxic sources. Among the aged,

* One part of a 10 per cent. solution of acriflavine in alcohol, to 1500 parts of refined castor oil.

the teeth and intestinal tract should be especially considered; and examinations of the blood and urine are also most important. After the removal of all discoverable causes, rest of the eyes, protective glasses, hot applications, a long continued bed time use of a mild solution of dionin, are helpful. In inflammations of the anterior uvea, the treatment does not differ from that indicated in youthful subjects, except in the greater caution necessary in the use of mydriatics.

Optic Nerve

Partial atrophy of the optic nerve as a purely senile manifestation, is rare. The only help available is through the improvement of the bodily condition, and amelioration of the cause.

Presbyopia

One of the greatest boons vouchsafed to humanity, has been the production of lenses. Without their aid, Hawthorne's words would fitly describe the fate of many senescents: "So age-worn and woful are they." There are many practical points worth considering in prescribing presbyopic glasses; but only a few of the most important can be mentioned. The lenses should be carefully adjusted for the distance at which the person desires to use his eyes. That distance varies greatly in musicians, the clergy, artists, typists, clerks in stores, mechanics, etc. It adds greatly to the comfort of old people, at times, to have glasses not only for the distance and for reading, but also for intermediate distances, such as for cards, music, billiards, picture galleries, etc. Particular pains should be observed in properly correcting the astigmatism, which changes with advancing years. The glass should be as weak as possible to answer the purpose. In the first decade of presbyopia, there is a tendency to prescribe glasses which are too strong. This favors the increase of presbyopia, limits the range of ocular efficiency, alters the normal relation between accommodation and convergence, with the result of physical discomfort and reflex nervous

disturbances. This is especially prone to occur, if the individual has a pre-existing insufficiency of convergence. Under these circumstances, the presbyope may have discomfort with his new glasses, in spite of their not being too strong. Converging exercises are very helpful. In the case of hyperphoria, the appropriate prisms in the glasses give comfort; but prisms base in, or out, should be prescribed only as a last resort.

After forty-five, one who is under a great nervous strain, or, who has to use his eyes very strenuously, often suffers from various reflex symptoms, without placing the responsibility upon the eyes. No one understood more clearly this relationship than Weir Mitchell, as the following account will illustrate.

In 1899, one of my distinguished townsmen consulted this great neurologist, on account of headaches, insomnia, gastric disturbances, etc. The patient seemed to be in excellent physical condition; and after listening to all the symptoms, Dr. Mitchell said: "I think your troubles come from eye-strain: get the proper glasses for your near work, and, if you are not relieved come back to me." To the ophthalmologist, Dr Mitchell wrote this characteristic note: "Dear ————: "Please Gould [3] Glover." Dr. Mitchell's diagnosis was promptly verified by the relief afforded by the glasses.

Senile Cataract

The dread of the knife and the frequency with which senile contract occurs, lead many people to seek a cure in impossible places. I operated on a very intelligent woman who had previously gone to live in South America in order to use in its native habitat a plant famed for its cure of cataract. Before that she had exhausted the knifeless cures of Europe! I have seen patients who had tried everything from powdered glass to radio- active lenses at

[3] At that time Dr. George M. Gould was writing much about the cure of many ills by wearing glasses.

$1,000.00 a pair. This class of eager pursuers of therapeutic "will o' the wisps" is by no means composed entirely of the ignorant.

The method of dealing with old people affected with cataract, is one of great psychological importance. I have very frequently examined the eyes of patients in this condition, where they have been most unhappily waiting, in idleness, for a cataract to "ripen" which did not "ripen." Often, old people have been brought to me with the request: "If mother has a cataract, or, any other serious trouble with her eyes, please don't tell her. I fear the effect of the shock upon her health." Invariably, I decline to make an examination without full liberty to tell the patient the actual facts as far as I deem it wise to do so. Very seldom have I found it prudent not to be perfectly frank about the matter. On the contrary, I usually say: "Yes, you have cataract; but that is of much less consequence than many other very serious affections that might cause your blurred sight. It is not likely to increase rapidly, if at all. Should it interfere seriously with your reading, the more advanced cataract can be removed with great hope of success. In the meantime the moderate and proper use of your eyes, will do them no harm, and will make you much happier." In such cases, my experience agrees with Jackson's [19]—that "the persons have been as grateful for the removal of their dread as they could have been for the removal of their cataracts." The usual response is: "I am so glad to learn what causes the little blur before my eyes. Now that I know it is not from a serious, incurable disease, I can use my eyes and be happy."

Patients with senile cataracts, form a large part of one's private, as well as hospital, practice; and it might not be entirely without profit to consider some factors which may add to the comfort of this class.

(1) In spite of the person's age, it is wise to make a survey for any contributing bodily condition, with the hope

of removal or mitigation. Teeth, colon stasis, and hyperglycemia are particularly important.

(2) Carefully balanced diet; reduction of meat, carbohydrates and salt; use of green vegetables; and sufficient water between meals.

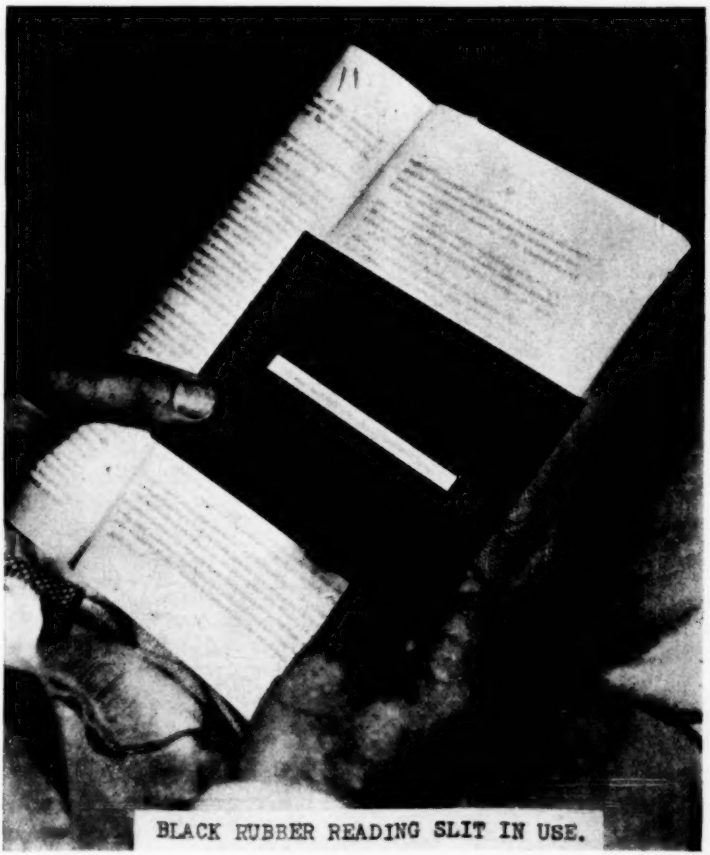
(3) The treatment of any coexisting ocular lesion, especially of the uveal tract.

(4) Alleviation of senile cataract has been sought in medicine, physiotherapy, serology, radiology. But it is very difficult to correlate the remedy with the non-progression of, or the improvement in, the lenticular opacities; for the reason that a large proportion of senile cataracts either progress very slowly, or remain stationary. But a mild solution of dionin over a long period, and hot applications followed by cold, may be used with the hope of aiding the nutrition of the lens.

(5) If the opacity is central, and there is no indication of glaucoma, a mild mydriatic improves vision by admitting more light. In such cases, I advise a 1 per cent. solution of homatropin combined with a 5 per cent. solution of ephedrin, to be instilled in the eyes every morning, with the permission to use an extra drop in the afternoon on special occasions.

(6) In advanced age, the miosis and rigidity of the pupil increase the visual impairment caused by the cataract. In such cases, even when there is a tendency to glaucoma, much comfort is rendered by a very simple reading slit of black rubber, 6 x 4 inches. In its center is an aperture 4 x ¼ inches. It is thin, very light and can be easily moved down the page while reading, the aperture making clear all of the print within its space. It lessens pupillary contraction which is caused by a large white reflecting surface; gets rid of blurred secondary images; reduces irregular astigmatism and spherical aberration. Like the mydriatic, this sometimes makes reading possible for persons too ill or infirm for an operation, or renders an operation unnecessary. In other cases, it enables one to

read until the cataract can be extracted. Nearsighted persons can use the slit without glasses; the farsighted can use their regular reading glasses in addition. The ordinary hand magnifying glass or the newer telescopic lenses may give added help (Fig. 11, black rubber reading slit).



BLACK RUBBER READING SLIT IN USE.

(11)

(7) In old people, as in younger ones, the ophthalmologist is confronted with many cases in which the lens becomes too opaque for useful vision, although the cataract is not mature in the usual sense of the word. In the aged, the problem is simpler than in youth; because practically the whole lens is hard, and it may be extracted by the usual combined method, or in capsule. In case there is some soft cortex, and the lens is extracted without its capsule, the proceeding is rendered safer by desensitizing the patient to lens protein beforehand if the intradermal test has shown that this is necessary.

(8) Not the least of the therapeutic measures, is the encouragement of the patient to use his eyes under the best condition of print, illumination, lenses, etc.

Glaucoma

As already stated, glaucoma chiefly belongs to the later decades of life. It is of the utmost importance to recognize early the acute attack with its accompaniments of general feeling of illness, and distressing nausea and vomiting, which often mask the eye symptoms. It is not seldom that such patients are sent to the surgical wards under the impression that there may be a brain tumor. Such attacks often yield to a hot bath, cathartic, rest in bed, morphin (without atropin), and locally pilocarpin, adrenalin and hot applications.

But it is the insidious, unnoticed, chronic form of glaucoma that exacts such a toll of sight. There is no pain until late, no disturbance of vision. In fact, there is such a lack of symptoms that the discovery of the malady is often incidental, while the eyes are being examined for glasses or some minor ocular trouble. Occasionally, the intelligent patient himself makes the discovery by noticing a contraction of the peripheral vision.

Elderly people, particularly hyperopes, should be taught that the disease is very insidious; and that a regular examination of the eyes, like that of the heart and kidneys, offers the best means of preventing the disaster that comes

when the glaucoma is recognized too late. In such patients, the ophthalmologist should make a particularly careful examination, testing the visual fields as well as the central acuity of vision. In every instance, the intra-ocular tension should be tested with the fingers; and, in case of doubt, with a reliable tonometer. One must also take into account the fact that usually the tension is less in age than in youth. Especial care to exclude glaucoma should be taken when the patient has lenticular opacities; because the "blur" of which the patient complains, may be attributed to the lenticular changes. Unfortunately, we too often see patients nearly blind from glaucoma who have been waiting for stationary opacities to become "ripe."

In a certain proportion of cases, the glaucoma can be controlled throughout the patient's life by the careful attention to bodily conditions, the use of miotics, etc. But if the patient has lenticular opacities in addition, the problem is much more complicated. The miotic may relieve the intra-ocular tension, but it will also make the vision worse by reducing the amount of light that reaches the retina.

If the glaucoma cannot be controlled by the treatment mentioned, one should not hesitate on account of the patient's age alone, to employ the operation appropriate for the individual case.

Epitome

An ancient philosopher considered "Age itself a disease:" a modern philosopher says that Age, like Youth, is rather a state of mind than a time of life. The latter view is more inspiring to the student of preventive medicine and of the humanities.

Experience teaches that some individuals are comparatively young at eighty, and others are old at forty. A distinguished pathologist, in considering the wasting of the organs in the aged, wonders if factors other than age do not play a part in this process. A noted physician feels

that presbyopia is definitely hastened by intestinal intoxication.

The effects of disease in the young simulate the degenerative changes of age. In the ocular abiotrophies, certain tissues present at birth the appearance of age; or, they may have implanted in them the seeds of premature senility. In youth, a wasting disease may cause one to look "hollow-eyed," with malposition of the lids; there is an arcus juvenilis as well as an arcus senilis; dystrophies of the cornea change its curvature, its translucency, its lustre. Cataracts may be congenital or they may occur early in life from nutritive or toxic disturbances of the lens. Infection may cause uveal and fundus changes not unlike those that are called senile. Inflammations, also, induce the disintegration of the iris pigment epithelial cells, with atrophy, and migration of the pigment granules. Glaucoma may be congenital from a fault in tissue development, or, it may follow intrauterine inflammation. The senile macular affection, "retinitis atrophicans centralis," is simulated in youth by traumatic or inflammatory lesions of the chorioid and retina (so-called "hole in the retina").

Human life is being prolonged by modern science; but, with the gift of these extra years, is linked the burden of the ailments of age—heart lesions, cerebral hemorrhage, nephritis, cataract, glaucoma. To these affections, unemployment is frequently added, and the problem becomes one of economic as well as humane interest.

Those advanced in years are not able to continue the bodily activities of youth; eyesight becomes more precious whether it is needed in gaining a livelihood, or in making less somber the shadows of the "evening of life." It is not possible to present an "elixir of life" or "fountain of ageless youth;" but we can well afford to heed Cicero's admonition, concerning the effects attendant upon long life: "To counteract their progress by constant and resolute opposition, and to combat the infirmities of old age as we would resist the approaches of disease."

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SPECIAL ASPECTS OF NEOPLASMS IN THE AGED[1]

(ABSTRACT)

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The greatest incidence of cancer occurs shortly after middle life, there is an increasing liability to cancer up to the end of life and liability to cancer has increased in the last two decades.

Studies do not show that there has been any increased tendency towards cancer in any individuals at any age. They merely show that people are living longer so that the lapse of time permits the expression of whatever tendency to cancer they may possess. The liability of exposure to exciting factors of some cancers, as of skin and lung, may have increased in the past 25 years, but studies do not prove this to be a fact.

The high incidence of cancer in old age is not limited to human beings, but probably exists in all species of animals.

I have been unable to find any report of a study of a large number of cases of cancer in old subjects with the object of determining to what extent the disease was the result of senescence. Cancer in the aged must be regarded as always pathological and not as an essential phase of the process of senescence. Senility merely acts in preparing the soil and rendering the tissues more susceptible to the action of the usual exciting factors, the presence of which is almost as essential as in the earlier periods of life. In general, the cancers of old age pursue a relatively slow course, depending on the reduced metabolism of this age period, but there are many cases which exhibit an unusually rapid growth. In the clinical course of cancers in the aged, secondary infection plays a very prominent part and often masks the true nature of the disease. Hence the proportion of unrecognized cancers is

[1] Delivered October 9, 1928.

higher in the aged than at other age periods. Owing to the very high incidence of cancer in the aged, the suspicion of this disease should be kept prominently in mind by diagnosticians. For the same reasons, special precautions against the outbreak of cancer may well be employed in the very aged. The detailed study of the action of factors essential to senescence in the origin of cancer in the aged is at present quite inadequate to determine the real influence of old age on the incidence of cancer.

X-RAY AND RADIUM IN THE PROBLEM OF OLD AGE [1]

(ABSTRACT)

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The general statement is frequently made in the text-books and the current literature of radio-therapy that tumors in the old are more susceptible to radiation than in the young. To test this I examined all the records of my clinic at St. Luke's Hospital of those above the age of sixty and found a considerable number of exceptions to this quite general statement. For instance, the bone sarcomata of the osteogenic type are highly resistant both in old and young. On the other hand, the giant cell tumors of the bone, which occur mostly in young people, are susceptible, while the few cases in the old are equally, though not more so. A case of the so-called endothelioma of the bone in a man of sixty-six was highly resistant to radiation, in contrast to the statements made that this tumor is very sensitive in the young.

In some of the diseases frequent in old age, radiation therapy is not as favorable as in younger people. One of these is herpes zoster, in which the pain as a rule is not as quickly checked as with the young. Pruritus of the aged is an extremely satisfactory condition to treat, as the results are often very good. It seems fully as sensitive, if

[1] Delivered October 9, 1928.

not more so, to treatment than pruritus in younger people. Radiation of the tonsils in old people is very satisfactory and may cause amelioration of local infection, chronic pharyngitis and tonsillitis, or the frequency of acute attacks, and relieves the symptoms of chronic rheumatism quite frequently.

In Hodgkin's disease no difference can be noticed. In lymphatic leukemia a certain number of patients do much better than in the more active disease of those below 60.

Prostatic enlargements, which rarely occur in the young, can be helped in selected cases, though good surgery, with its present low mortality in skillful hands, is more effective.

Primary carcinoma of the lung is generally resistant, but in a very few patients good palliation may be obtained.

Carcinoma of the lip is apparently less malignant in the aged, but occasionally a case is met which is just as resistant to radiation as any in those of earlier ages.

In carcinoma of the prostate nothing but palliation is obtained. Occasionally, however, the patient's life may be prolonged in fair comfort for a year or more.

Carcinoma of the bladder is quite susceptible to radiation, and it might be well to ray all of these patients after fulguration or operation to control the return of the growth if possible and prolong life.

Penile carcinoma is in many cases highly resistant, as is carcinoma of the esophagus. I have also never seen the slightest benefit result from raying carcinoma of the stomach, either in the young or old.

Carcinoma of the breast, on the other hand, is often strikingly sensitive to radiation in the aged regardless of type and inoperable cases should all be handled with the greatest vigor and promptness as one of the most satisfactory fields for radiation therapy.

In carcinoma of the larynx the very old do not seem more susceptible, but the histological type is important here.

Old people vary in their susceptibility to withstand heavy radiation. Some bear it without the slightest reaction; others are prostrated, and in a few cases treatment must be given up, but on the whole they bear it better than the young. The skin also will usually bear heavier doses.

HYPERTENSION [1]

(ABSTRACT)

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Many considerations need to be taken into account in appraising the seriousness of high blood pressure. It is not confined to elderly people, but exists in those of middle age and even among those younger.

The rise of blood pressure with advancing years may be regarded either as a sign of physical deterioration or a physiological expression of growing old. The blood pressures in older people are prone to vary much more from average figures than is the case in younger individuals. Blood pressure higher than the average normal is not necessarily a bad prognostic sign or an indication of disease.

High blood pressure with no other impairment may often be corrected by diet, change in mode of living, proper exercise, etc., even to the extent of making the patient eligible for insurance, whereas he would have been rejected because of the blood pressure existing before the remedial regime was instituted. Even in cases of high blood pressure among aged people, proper treatment of the heart may

[1] Delivered October 10, 1928.

frequently remedy the condition. Deviations from normal blood pressure should be primarily regarded as symptoms that the heart is not functioning normally and adequately and such remedial treatment as is possible should be resorted to.

ANGINA PECTORIS [1]

(ABSTRACT)

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Nothing can appear more obvious to the ordinary students of the subject of angina pectoris than that the most frequently associated factor in causing the disease is emotional stress. No other one immediate factor is so dominant in the precipitation of the immediate paroxysm, and the very tendency of the disease to manifest itself chiefly in certain occupations and types of individuals is further illustrative of this fact.

The spiritual side of the case must not be neglected in this disease, in which emotions play so important a role. The development of the philosophy of life of the power of adaptation of desire to possibilities, the cultivation of suitable hobbies of a restful character such as reading, music and such pacific occupations as painting, etching, carving and similar prusuits, are of real medical benefit. Habits of restfulness and relaxation are to be cultivated. Climate is often very important and those who live in the temperate zones may well spend their winters in the south or perhaps go to live permanently in some mild temperate and congenial climate. Few patients do well in the cold places or at high altitudes. Each case must be made an individual problem. Sleep and rest are of crucial importance. Alcohol has a very definite benefit in very many cases, especially among the aged and arterosclerotic.

If we sufficiently individualize treatment, we are much more likely to give relief as well as a prolonged and not

[1] Delivered October 11, 1928.

inconsiderable period of worth-while life and efficiency Most of us can now cite unmistakeable instances in which complete relief, even cure, if you like, have been effected.

I think that all of us will admit that the condition is now much more frequent than was the case in the not remote past. Twenty or thirty years ago the disease was relatively rare in the so-called hospital classes. I have an explanation to offer for this fact, none other than that we are now certainly much more generally competent in the diagnostics and recognition of the complex. A few years back, it was considered almost as a disease of the intelligent aristocracy, and as particularly of great frequency among our own and other professions, a disease of the 'intelligentsia' if I may so say it. This distinction, in my observation, no longer pertains. I am finding angina frequent in my wards at the City Hospital, which is a charity hospital and one which caters I may say exclusively to the most unfortunate classes of our people. In my analysis of these cases at the hospital I have found almost without exception the disease associated with worry and great stress of life. These features are no longer confined to the so-called brain worker. All classes of society are now living lives of great and increasing emotional stress. The obligatory demand presented to every person, physical or brain worker, is for more speed, greater production and greater stress in every relation.

The statistical data which I have utilized in the preparation of this paper have been taken exclusively from my private consulting practice. Of the series of 320 cases studied, 62 persons, including most of the women, were engaged in domestic occupations. But 18 were physical laborers, including policemen, soldiers, firemen and the like; 26 cases were of the learned professions, 15 were engaged in artistic callings, 8 were financiers, 3 engineers. 50 patients occupied executive positions, and 79 were engaged in business ventures. This list suggests, of course, an increased occurrence among executives and business

men. As in all lists of this kind, the decisive ratios are largely influenced by the preponderating character of the clientele which comes to any particular physician.

It is my impression that the complex is of growing occurrence among women, due perhaps, to the increased stress of life to which they are obligated by the modern vocations of women, but my data still show a very high preponderance of men; notwithstanding the fact that my practice is about equally divided between men and women, 244 men are recorded in my data as compared to but 76 women.

In but four cases of true angina under my observation has tobacco been a possible causative factor; it is a common productive factor in toxic angina. This relation is becoming more and more important since women have so widely taken up the use of tobacco, for as a class I think we may definitely say that women are far more susceptible to the bad effects of tobacco then men. They are also for various reasons much more likely to carry the use of the weed beyond, far beyond, the mere employment designed to give pleasure and a feeling of content to the formation of a definite injurious habit. I am prepared, however, to admit with very few qualifications that the use of tobacco is undesirable in true angina pectoris, that it tends to augment the severity of bonafide attacks, to increase their frequency and greatly to increase the danger of the attacks. I know, however, of no authoritative study which has shown that tobacco can produce any changes in the heart muscle, in the coronary arteries or in the aorta which are capable of causing a true angina. I have never seen a case of supposed tobacco angina die, except that there were found after death lesions quite typical of those which cause angina pectoris and which can not be produced by tobacco alone. I have seen many instances of tobacco angina which were very distressing. I have seen patients so sensitized to the effects of tobacco that they might not enter a room in which smoking was going on without developing an attack, a clinical picture which is almost the

exact counterpart of a true anginal attack, but I have never seen such a case die. Almost without exception, prompt giving up of the drug in persons who have developed tobacco angina is followed almost, if not quite immediately, by a cessation of the attacks. I have seen no treatment in true angina which is so successful.

Coffee angina is much more frequent in advertising literature than in medical reports.

I have never seen a case of angina caused by the abuse of tea. I believe, nonetheless, that they do occur, but probably in very small numbers, save in populations which consume tea in greater abundance than is customary in the localities in which I have practiced. English and Canadian colleagues have described cases to me.

In all the toxic anginas almost immediate relief follows the elimination of the causative drug. Insofar as I can determine in none of the cases are any permanent lesions developed and the only treatment necessary is abstention from the drug.

Nearly every practitioner of years of experience has found families on his list who show a very definite family tendency toward the complex. It has been the most frequent manner of exitus in my own family for three generations, at least.

SENESCENCE AND REJUVENESCENCE FROM A BIOLOGICAL STANDPOINT [1]

(ABSTRACT)

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In the simpler multicellular organisms senescence becomes evident as a decrease in respiratory metabolism and rate of growth. It may lead to death, but in many forms it leads to some process of asexual reproduction with re-

[1] The Harvey Lecture. Delivered October 11, 1928.

juvenescence, and death does not occur. In general in such organisms rejuvenescence occurs in the reorganization accompanying the formation of new individuals by budding, fission, etc. from parts of the original body, or by extreme starvation. In consequence of such rejuvenescence such organisms have no definite length of life and their physiological age cannot be measured in terms of time.

In the higher animals and man senescence shows the same general characteristics as in the simpler organisms, but the capacity of the body cells for rejuvenescence is narrowly limited under any known conditions. Changes which appear to constitute a slight degree of rejuvenescence can probably be brought about in various ways in man and the higher animals, but they are at best very slight.

Senescence is not a phenomenon of later life, but is going on from early developmental stages. In fact the organism is growing old most rapidly when it is youngest. Senescence apparently consists in accumulation of more or less inert products of metabolism and in progressive changes in protoplasms which make them less capable of maintaining metabolism and growth. Life, so to speak, clogs its own machinery. When conditions are so altered that previously accumulated inert substances are decomposed and removed and the protoplasmic changes of senescence are reversed, rejuvenescence occurs.

Various other periodic or cyclic phenomena in organisms appear to be fundamentally similar to senescence and rejuvenescence of the individual. The egg and the sperm, for example, are apparently highly differentiated, physiologically old cells nearing death from old age. Fertilization, however, initiates a process of rejuvenescence. In the early stages of embryonic development the organism is growing young, as various lines of physiological investigation have shown, and it is youngest, not at the beginning of development, but at a later embryonic stage.

There is some evidence that even in the unicellular organisms and in the cells of multicellular forms there may be some slight senescence in the period between successive divisions and that this is more or less completely compensated in the processes of division. The cycle of activity of various gland cells such as the pancreas cell resembles in certain respects an age cycle. The period of loading of the cell is a period of accumulation of substance and decreasing metabolism, the period of discharge, a period of dedifferentiation and increasing metabolism.

Senescence and rejuvenescence are biological terms which designate certain aspects of the equilibration process which constitutes life. They undoubtedly include a wide range of physicochemical changes which differ in character in different organisms. What these changes are we shall learn only as we learn what protoplasms and life are.

LIVER AND BILIARY PASSAGES[1]

(ABSTRACT)

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Although the liver is the largest organ in the body, and has probably a greater amount of duties than any other organ, still it is remarkably free from changes which are the direct result of age; no important organ is more so. This is due largely to the peculiar blood supply of the liver and the practical absence of arterial degeneration. We hear a lot about senile degeneration of the heart muscle and of the arteries and of senile changes in the kidneys and the brain, but we do not hear much about the senile liver. Any changes in function produced are very much less clear and definite.

Even in the digestive tract there is a marked contrast between the liver and other organs. We know what eld-

[1] Delivered October 12, 1928.

erly stomachs can do. We know that the secretion gradually lessens and often disappears and there is a gradual loss of tone and change in peristalsis. We are much less sure what the elderly liver will do. The liver has a vast reserve function, a margin of safety, which conceals its troubles, and for these reasons early recognition and prevention of changes in the liver present some peculiar difficulties.

Diseases of the gall bladder on the other hand increase in frequency with advancing age and are the most common diseases of the liver and bile passages in old age.

We may classify diseases of the liver and gall bladder with reference to age into three groups.

1. Primary senile degeneration of the liver, a pathological not a clinical entity and not very important.

2. Diseases which may be partly the result of changes in middle life or at least associated with them; the various cirrhoses and fatty degeneration of the liver.

3. Diseases which occur most frequently in middle or old age; syphilis, gall stones and cancer of the liver and gall bladder.

Functional tests of the liver are much less successful than those of the kidneys for various reasons. The kidney is an excretory organ and both the initial material, the blood, and the excreted product, the urine, are easily obtained. The liver has many functions, it is concerned with portal blood, the bile cannot be directly collected and the tests are not very delicate. The tests most commonly used at present are tests for bilirubin in the blood and tests of the excretion of dyes, especially brom-sulph-phthalein. It is not at all common to test liver function to see if the liver is getting old.

Jaundice is our most striking gross sign of liver disease. It may be classified as obstructive, intrahepatic (toxic, infectious) and hemolytic. The type of jaundice may usually be diagnosed by a study of the presence and

character of the pain, the age, the amount of bile in the intestine (tests of feces, biliary drainage), the amount of bile pigment in the blood and the usual tests for hemolytic jaundice.

The most important causes of gall bladder disease are biliary stasis, infection and changes in metabolism. Cholesterosis is especially associated with a rich diet, obesity and pregnancy. In the diagnosis of gall bladder disease the history, ordinary physical examination and the Graham test are of major importance. The bile index, biliary drainage and liver function tests are considered of minor value. [2]

The use of the Graham test has greatly advanced our knowledge of the physiology of the gall bladder and our diagnoses. It is no discredit to this remarkable method to have some limitations. The figures reported from many clinics of 97-98 per cent. accurate diagnoses suggest that we can divide normal and abnormal gall bladders into two groups with only 2 or 3 per cent. of error. This is not really true. Authors have tended to emphasize the positive correct diagnoses on the operated cases, namely the ones found, and have said less about those missed, where the tests were normal and a pathological gall bladder was found at operation. In Graham's collection of authors this error was 26 per cent. and in Kirklin's series of 500 operated cases at the Mayo clinic this error was 30 per cent. Kirklin frankly called a negative result the least reliable sign in the Graham test.

The operative group is also highly selected. This test is so popular that only one case in ten tested comes to operation; in short all our definite statistics come from about 10 per cent. of the cases examined.

Some important additions have been made to the treatment of liver disease in recent years in increasing the re-

[2] These diagnostic measures are described in detail in a recent paper by the author, entitled Medical Aspects of the Diseases of the Gall Bladder and Bile Passages in the *New England Journal of Medicine*, 1928. Vol. 199, p. 719.

sistence of the liver to toxins by the use of glucose in making the treatment of syphilis of the liver more safe and in the treatment of ascites.

Early recognition and treatment of the toxemias of pregnancy and of focal infections which may produce local necroses in the liver are really important preservative measures.

In syphilis of the liver it is wise to give mercury and potassium iodide by mouth cautiously for several months so that fibrosis will be gradual and time allowed for collateral circulation to form. Early arsenic often does more harm than good.

In the treatment of ascites the new mercurial merbephen is quite successful in about a half of the cases, combined with ammonium chloride and Keith's dry diet. The toxemias of cirrhosis are little understood and the treatment is unsatisfactory. Glucose may give temporary relief.

Medical treatment of diseases of the gall bladder have lagged behind diagnosis. There is still a wide space between the ideal and actual medical treatment, but our present knowledge of the physiology of the gall bladder gives us a better guide to the value of any treatment proposed.

Our best cholagogue, bile salts, has little effect in emptying the gall bladder. The best diet for emptying the gall bladder, rich in fats, is difficult to combine with weight reduction which is so often needed. Lyon's biliary drainage has given a great impetus to the study of the gall bladder, but seems somewhat illogical with our present knowledge of the emptying of the gall bladder. McClure's work suggests that biliary drainage affects the liver (hepatitis) more than the gall bladder and that clinical improvement is due to restored liver function.

McMaster has shown that the output of cholesterol and its concentration in the bile is greatly increased by a rich diet and that the cholesterol is reduced at once by partly

excluding fats and lipoids from the diet. We hope that added knowledge of cholesterol metabolism will gradually lead to a better control of the formation of gall stones.

Surgery still holds the leading place in treatment of gall stones which cause symptoms.

DIGESTIVE PROBLEMS[1]

(Abstract)

Thomas R. Brown,

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In our diagnosis, our therapy, our prognosis, we must consider the age of the patient. With our finer methods of diagnosis, more increased skill in the use of diet and physical methods, and better surgical procedure, there is an ever increasing number of cures in the case of patients in the 60s and 70s, where 10 or 20 years ago little would have been done to cure, and only halfhearted attempts made to make them more comfortable.

A considerable portion of the happiness of the old is dependent upon the condition of their digestive apparatus. Age has its compensations for the interests of the soul, even the activities of the mind may be enhanced by broader vision and the philosophic calm of increasing years. But they become as dust and ashes if the tongue be coated and the stomach awry.

Cancer is and always will be the subject of supreme interest to physicians and laity. Its consideration is of peculiar importance in this discussion because while met with in early life, it is peculiarly a disease of later life and old age.

Cancer seems to be on the increase, but how much of this is due to better methods of diagnosis and ever-increasing interest in the disease; how much to the steady increase of the average age of man with *ipso facto* the increasing in-

[1] Delivered October 12, 1928

cidence of diseases more frequently met with in later life; and how much to a real increase in the disease, irrespective of age, but possibly caused by errors and accidents peculiar to an increasingly complex civilization, it is hard to say. Cancer of the stomach is very common, next in frequency to uterine cancer.

In all cases, but especially in the middle aged and old, the possibility of malignancy should be suspected in every one whose intestinal habit shows a change. While surgery is the only cure, early diagnosis is important to give surgery a fair chance of success. Early suspicion is more apt to lead to early diagnosis.

Simple rules of living as regards rest and exercise for the aged, with a temperate diet and as few drugs as possible are indicated in the treatment of dyspepsia in the old, the knowledge that comes from experience and common sense is of far greater value than that which comes from the library studies of the most exquisite perfection.

CATALOGUE

OF

AN EXHIBITION OF BOOKS, ETC., ON OLD AGE,

HELD IN THE LIBRARY OF

THE NEW YORK ACADEMY OF MEDICINE

IN CONNECTION WITH THE FIRST ANNUAL GRADUATE FORTNIGHT,

OCTOBER, 1928 *

ALCHEMICAL BOOKS, ETC.

1. Passage showing that fire was supposed to purge away the mortal parts of men, leaving the immortal.
   In: Frazer, J. G. *Adonis, Attis, Osiris* ... i, 180-181. In his: *Golden Bough*. 3. ed. London, Macmillan, 1914, Part iv.

2. Discussion of the savage notion that men would be immortal if only they could either wear or cast their skins like serpents or crabs.
   In: Frazer, J. G. *The Scapegoat*, pp. 302-303. In his: *Golden Bough*. 3. ed. London, Macmillan, 1914, Part vi.

3. Passage about potable gold.
   In: Allendy, René-Félix. *L'Alchimie et la Médecine*. Paris, Chacornac, 1912, p. 148. (Université de Paris. Thèse pour le Doctorat en Médecine)
   Alchemists used the term as another name for the Elixir of of Youth.

4. Pages giving an extract from the discourses of Eirenaeus Philoponos, an unknown person, which present a very curious and amusing dissertation on the various Elixirs and the Philosophers' Stone.
   In: Waite, Arthur Edward. *The Secret Tradition in Alchemy* ... London, Kegan Paul, 1926, pp. 302-303.

5. Chapter concerning the origin of the Philosophers' Stone.
   In: Waite, Arthur Edward. *The Hermetic and Alchemical Writings of Paracelsus the Great*. London, Elliott, 1894, i, 48-49.

6. Passages showing that amongst the alchemists the search was for two things, the Philosophers' Stone which would transmute baser metals into gold, and the Elixir of Life which would restore youth.
   In: Redgrove, H. Stanley. *Alchemy, Ancient and Modern*. 2. ed. rev. London, Rider, 1922, pp. 34-36.

7. A book concerning long life, by Paracelsus.
   In: Waite, Arthur Edward. *The Hermetic and Alchemical Writings of Paracelsus the Great*. London, Elliott, 1894, ii, 323-324.
   Aureolus Philippus Theophrastus Bombast von Hohenheim (Paracelsus), 1493-1541, was one of the greatest students of

**Librarian's note.* A great deal of the work of arranging this exhibition was done by Dr. E. J. Rhodebeck, a Fellow of the Academy.

alchemy and claimed to have discovered the Philosophers' Stone and the Elixir of Youth, in spite of which he died poor at the early age of 48.

8. Roger Bacon's treatise on the "Cure of Old Age", giving a cryptic formula for an Elixir of Youth.
   In: Sinclair, St. John. *The Code of Health and Longevity.* Edinburgh, Constable, 1807, iv, 12-13.

9. Bacon, Roger. *Medulla Alchimiae* ... Eissleben, Jacobus Gaubisch, 1608.
   Treatises on the Stone of the Wise and the various transmuting tinctures.

10. Formula for an oil which "mayntaineth the person long youthful".
    In: Gesner, Conrad. *The Newe Jewel of Health ... Faithfully corrected nad published in Englishe by George Baker, Chirurgian.* London, Denham, 1576, pp. 158-159.
    (From the Dr. E. C. Streeter collection in the Academy)

11. The chapter "Of Retarding the Accidents of Old Age and Prolongation of Life".
    In: Bacon, Roger. *Discovery of the Miracles of Art, Nature and Magic.* London, Miller, 1659, pp. 28-35.

12. Passages demonstrating popular beliefs in regard to the efficacy of the youth-giving Elixir.
    In: Jonson, Ben. *The Alchemist.* London, Snodham, 1612, Act 2, Scene 1, Sig. Dl.
    (Lent by Dr. E. J. Rhodebeck)

13. Alexis Pedemontanus. *De' Secreti del Reverendo Donno Alessio Piemontese* ... Turino, Bevilacqua, 1580.
    This is a treatise on the government of health and the retardation of age.

14. Chapter dealing with the determination of individual longevity by means of bodily measurements.
    In: *An English Translation of the Sushruta Samhita ... edited and published by Kaviraj Lal Bhishagratna.* Calcutta, 1907, i, 308-328.

EARLIER BOOKS ON OLD AGE

15. Arnoldus de Villa Nova. *The Conservation of Youth and Defense of Age ... Translated by Dr. Jonas Drummond ... edited by Charles L. Dana.* Woodstock, Vt., The Elm Tree Press, 1912.
    This is a facsimile reprint of the early English translation of 1544.

16. The book "De conservanda juventute et retardanda senectute".
    In: Arnoldus de Villa Nova. *Opera omnia.* Basiliae, Conrad Waldkirch, 1585.
    (From the Dr. E. C. Streeter collection in the Academy)

17. Cicero, Marcus Tullius. *Cato Major, or his Discourse of Old Age ...* Philadelphia, B. Franklin, 1744.
    This is the first edition of the English translation by Mr. Logan of Philadelphia.
    (Kindly lent by the President, Dr. Samuel W. Lambert)

18. Cornaro, Luigi. *Sure Methods of Attaining a Long and Healthful Life ... Translated into English by W. Jones.* Edinburgh, Donaldson, 1768.
    Luigi Cornaro (1464-1566), after a life of intemperance to the age of forty, then changed his life so completely that his diseases disappeared and he attained a rugged health which persisted till his death at the age of 102. His book on the means of attaining a long and healthy life was written at successive periods in his later life and is one of the epics on the subject.

19. Cornaro, Luigi. *The Art of Living Long.* Milwaukee, Butler, 1905.

20. Cornaro, Luigi. *Means of Obtaining a Long and Healthy Life ... To which is added, The Way to Wealth, by Dr. Franklin.* Philadelphia, Johnson, 1809.

21. The third discourse, written at the age of ninety-one.
    In: Cornaro, Luigi. *The Art of Living Long.* Milwaukee, Butler, 1903, p. 91.

22. Cornaro, Luigi. *L'Art de vivre longtemps ... suivis des aphorismes de l'Ecole de Salerne ...* Paris, Rouvier, 1847.

23. *Regimen Sanitatis Salerni ... translated out of the Latyne tongue into Englishe by Thomas Paynel ...* London, Bertheleti, 1541.
    This is one of the earliest and best books on the regulation of living. It is the product of the most famous of all schools of medicine, that of Salerno, and was the popular book of remedies for 150 years.
    (From the Dr. E. C. Streeter collection in the Academy)

24. Paragraph dealing with the regulation of living in old age.
    In: Elyot, Thomas. *The Castel of Helth.* London, Bertheleti, 1541, p. 41.
    Thomas Elyot (1490?-1546), was a diplomatist as well as an author. He was chiefly interested in political philosophy and the theory of education. This is the third edition of his book. The first (1534) of which no copy is known is said to have been dedicated to Cromwell.
    (From the Dr. E. C. Streeter collection in the Academy)

25. Ficinus Florentinus, Marsilius. *De triplici vita.* n.p., n.d.
    The contents are three books on life: "De vita sana", "De vita longa", and "De vita coelitus comparanda". Probably printed at Basle not later than 1498.

26. Ficinus Florentinus, Marsilius. *Medicinarius. Das Buch der Gesundheit.* [Strassburg, 1505].

This is an early German work on the preservation of health and the prolongation of life.

BOOKS FROM 1503 TO 1800

27. Rangoni, Tommaso. *De Vita Hominis ultra CXX annos protrahendra.* Venetiis, 1553.

Thomas Philologus Ravenna was the pseudonym used by Tommaso Rangoni.

28. Maynwaringe, Everard. *Vita Sana et Longa. The Preservation of Health and Prolongation of Life* ... London, J. D., 1670.

Maynwaringe was regarded as an empiric by his contemporaries.

29. Venner, Tobias. *Via Recta ad Vitam Longam* ... London, Flesher, 1650.

This is the first edition of the treatise of a means for "attaining to a long and healthful life".

30. The use of Usquebath (whiskey) for sustaining the aged.

In: Venner, Tobias. *Via Recta ad Vitam Longam.* 4. ed. London, Roper, 1660, p. 66.

(Kindly lent by the President, Dr. Samuel W. Lambert)

31. Floyer, Sir John. *The Art of Preserving Old Men's Healths* ... 2. ed. London, J. Torbuck, 1738.

Sir John Floyer was one of the most original physicians of the period in which he lived. He was the first to make regular observations upon the rate of the pulse, counting the number of beats in a minute by the watch.

32. Floyer, Sir John. *Medicina Gerocomica: or, The Galenic Art of Preserving Old Men's Healths* ... London, Isted, 1724.

It was Floyer who advised that young Samuel Johnson be sent up to be touched by Queen Anne for the "King's evil".

33. Card inscribed: The famous George Cheyne, a man of enormous bulk, reduced himself by dieting from 448 pounds to proper dimensions. One of his aphorisms says: "Every wise man after fifty ought to begin to lessen at least the quantity of his aliment, and if he would continue free from great and dangerous distempers and preserve his senses and faculties clear to the last, he ought every seven years to go on abating gradually and sensibly and at last descend out of life as he ascended into it, even into a child's diet."

From: Osler, William. *The Principles and Practice of Medicine.* 10. ed. New York, Appleton, 1925, p. 446.

34. Cheyne, George. *An Essay of Health and Long Life.* 6. ed. London, George Strahan, 1725.

George Cheyne (1671-1743) studied under Archibald Pitcairn. He was an ardent vegetarian and stated that God allowed the use of animal food to man only to shorten his life through the consequent multiplication of diseases and suffering.

35. Comparison between a sober and an intemperate life.
In: [Cheyne, George.] *Medicina Flagellata: or, The Doctor Scarify'd.* London, J. Bateman, 1721, p. 150.
This book is attributed to Cheyne, but cannot be said with certainty to have been written by him.
(From the Dr. E. C. Streeter collection in the Academy)

36. [Cohansen, Joannes Henricus.] *Hermippus Redivivus: or, The Sage's Triumph over Old Age and the Grave ...* 2. ed. London, J. Nourse, 1749.

37. Hufeland, Christoph Wilhelm. *Die Kunst das menschliche Leben zu verlängern.* Jena, 1798.

38. Easton, James. *Health and Longevity.* New and improved ed. Salisbury, The Compiler, 1823.

39. Easton, James. *Human Longevity: recording the name, age, place of residence, and year of the decease of 1712 persons who attained a century and upwards ...* Salisbury, James Easton, 1799.

BOOKS FROM 1800 TO 1855

40. Seiler, Burcardo Guilielmo. *Anatomiae corporis humani senilis specimen.* Erlangae, Jo. Jac. Palm, 1800.
This book was written when Seiler was 20 years old and in the year of his graduation from Erlangen University.

41. John Rorin in the 172nd and Sarah, his wife, in the 164th year of their respective ages.
Frontispiece of: Sinclair, Sir John. *The Code of Health and Longevity ...* Edinburgh, Constable, 1807, vol. i.
Sir John Sinclair (1754-1835), the first president of the Board of Agriculture, devoted much of his time in his later years to the composition of what he called the Codean System of Literature, in which all knowledge was to be summarized in four departments, comprising agriculture, health, political economy and religion. The code of health was published in four volumes in 1807, and the code of agriculture in 1817. The other two were never completed though materials were collected and the plan drawn up. Sir John's excursion into medicine brought upon him considerable ridicule. It was, as he himself says, "undertaken in opposition to the opinions of some most respectable friends".

42. Petratsch Zortan in the 185th year of his age.
Frontispiece of: Sinclair, Sir John. *The Code of Health and Longevity ...* Edinburgh, Constable, 1807, vol. ii.

43. Johnson, James. *The Economy of Health ...* New York, Harper, 1837.
James Johnson (1777-1845) was a naval surgeon and a man of much ability and industry.

44. Carlisle, Anthony. *An Essay on the Disorders of Old Age ...* 2. ed. London, **Longman, 1818.**

Sir Anthony Carlisle (1768-1840) introduced the thin bladed, straight edged amputating knife in place of the old clumsy crooked one.

45. Carlisle, Anthony. *The Means of Preserving Health and Prolonging Life ...* London, Churchill, 1841.

46. Bell, John. *On Regimen and Longevity ...* Philadelphia, Haswell & Johnson, 1842.

John Bell (1763-1820) was a lecturer on anatomy and surgery at the Royal College of Surgeons, Edinburgh, where he was the leading operating surgeon for twenty years.

47. Day, George Edward. *A Practical Treatise on the Domestic Management and Most Important Diseases of Advanced Life.* London, Boone, 1849.

George Edward Day (1815-1872) was an industrious contributor to medical periodical literature and to the publications of many learned societies.

48. Bostwick, Homer. *An Inquiry into the Cause of Natural Death or Death from Old Age.* New York, Stringer and Townsend, 1851.

49. Durand-Fardel, Charles Louis Maxime. *Traité Clinique et Pratique des Maladies des Vieillards.* Paris, Baillière, 1854.

Charles Louis Maxime Durand-Fardel (1815-1899) was particularly noted for his work on mineral waters and especially those of Vichy. It was undoubtedly here that he acquired his interest in chronic disease and the diseases of old age.

50. Durand-Fardel, Charles Louis Maxime. *Handbuch der Krankheiten des Greisenalters.* Würzburg, Stahel, 1858.

BOOKS FROM 1855 TO 1878

51. Flourens, Marie Jean Pierre. *On Human Longevity ... Translated from the French. 2. ed. ed. by Charles Martel.* London, Baillière, 1855.

Marie Jean Pierre Flourens (1794-1869) was professor of anatomy at the University of Paris. His famous axiom was that since it takes a man twenty years to grow he should live five times that, or one hundred years.

52. *Charcot, Jean Martin. Leçons Clinques sur les Maladies des Vieillards ...* Paris, Delahaye, 1867.

Jean Martin Charcot (1825-1893) was born in Paris where he became during his active years the outstanding medical figure in France. He was chief physician to the Hospice Salpêtrière and it was here during the years 1866-1878 that he studied and and wrote of chronic diseases, diseases of old age, and diseases of the nervous system. It is on this last work that his fame rests.

53. Charcot, Jean Martin. *Leçons sur les Maladies des Vieillards.* Paris. Delahaye, 1868.

54. Charcot, Jean Martin. *Clinical Lectures on the Diseases of Old Age. Translated by Leigh H. Hunt.* New York, Wood, 1881.

55. Charcot, Jean Martin. *Clinical Lectures on Senile and Chronic Diseases. Translated by William S. Tuke.* London, New Sydenham Society, 1881.

56. Lambert, T. S. *Longevity.* Part I. Biometry (The Measure or Span of Life). New York, Wood, 1869.

57. Noirot, L. *L'Art de Vivre Longtemps.* 6. ed. Paris, Dentu, 1869.

58. Lalor, Robert D. *The Origin of Life and the Causes of Death* ... 5. ed. London, Bay House, 1874.

59. Gardner, John. *Longevity: The Means of Prolonging Life after Middle Age.* London, King, 1874.

60. Hall, William W. *How to Live Long* ... New York, Hurd and Houghton, 1875.

William Whitty Hall (1810-1876) came to New York in 1851, and in 1854 established "Hall's Journal of Health", a periodical which he ably conducted for many years.

BOOKS FROM 1879 TO 1908

61. Evans, Chas. W. DeLacy. *Can we Prolong Life?* ... London, Baillière, 1879.

62. Bailey, John Burn. *Modern Methuselahs* ... London, Chapman and Hall, 1888.

63. Young, T. E. *On Centenarians; and the Duration of the Human Race.* London, Layton, 1899.

64. Crichton-Browne, Sir James. *The Prevention of Senility and a Sanitary Outlook.* London, Macmillan, 1905.

65. Hufeland, Christopher William. *The Art of Prolonging Life. Edited by Erasmus Wilson.* Philadelphia, Lindsay & Blakiston, 1880.

66. Page showing the formula for Brown-Séquard's Elixir of Life.
In his: *The Elixir of Life* ... *edited by Dunbar Newell.* Boston, Cupples, 1889, pp. 24-25.

Charles Edouard Brown-Séquard (1817-1894) a noted physiologist, was educated in Paris under Trousseau and immediately devoted himself to the most recondite parts of physiology. His studies on the spinal cord tracts were of most importance, and he shares with Claude Bernard the honor of demonstrating the existence of vasomotor nerves. The Elixir of Life was formulated in later years and bore the crude germ of gland transplantation. Brown-Séquard died in Paris in April, 1894.

67. de Plasse, L. *La Longévité ou l'Art de Prolonger la Vie.* New York, Weiss, 1902.

68. Dorland, W. A. Newman. *The Age of Mental Virility* ... New York, Century, 1908.

69. Humphry, George Murray. *Old Age and Changes Incidental to It. The annual oration delivered before the Medical Society of London, May 4th,* 1885. Cambridge, Macmillan and Bowes, 1885.

70. André, G. *L'Hygiène des Vieillards.* Paris, Doin, 1890.

71. Card inscribed: "Mix merry laughter with earnest labor. Always have some as yet unfinished but not too urgent job waiting just outside your door. Then you will never know ennui. To 'kill time' is murder in the first degree." W. W. Keen's receipt for longevity in his address at the dinner celebrating his 84th birthday (1921).
In: Keen, W. W. *The Surgical Operations on President Cleveland in* 1893 ... Philadelphia, 1928, p. 230.
William W. Keen of Philadelphia, the doyen of the American medical profession, is an honorary Fellow of the Academy.

72. Walsh, David. *Age and Old Age* ... London, Everett, 1902.

73. Minot, Charles S. *The Problem of Age, Growth, and Death.* New York, Putnam, 1908.
Charles Sedgwick Minot (1852-1914) was James Stillman professor of comparative anatomy and director of anatomical laboratories at Harvard Medical College from 1905 to his death. He was trained as a physiologist under Ludwig at Leipzig, carrying out several physiological researches on muscle, growth, etc. He has devised two forms of automatic microtomes.

BOOKS FROM 1908 TO 1914

74. Chapter on microbes as the cause of senility.
In: Metchnikoff, Elie. *The Prolongation of Life ... English translation; edited by P. Chalmers Mitchell.* New York, Putnam, 1908, pp. 73-83.
Elie Metchnikoff (1845-1916) was born in Russia. He studied and lived most of his life there and gained considerable renown as a biologist especially because of his researches on the embryological origin of the intestine and on the problem of intracellular digestion. He went to the Pasteur Institute in Paris in 1887 and it was here that he instituted his studies on the lactic bacilli and the conquest of intestinal putrefaction. His famous aphorism on the relationship of age to one's gastronomic régime is "nous vieillissons par le ventre".

75. Metchnikoff, Elie and Williams, Henry Smith. Why Not Live Forever? *Cosmopolitan Magazine,* 1912, pp. 436-446.

76. Roeser, P. H. *Vieillesse et Longévité.* Paris, Maloine, 1910.

77. Mühlmann, M. Das Altern und der physiologische Tod ...
In: *Sammlung anatomischer und physiologischer Vorträge und Aufsätze.* Heft 11, Jena, Fischer, 1910.

78. Henley, B. J. *The Art of Longevity* ... Syracuse, N. Y., 1911.
79. Weber, Sir Hermann. *On Means for the Prolongation of Life* ... 3. ed. enl. London, Bale, 1908.
80. Pic, Adrien. *Précis des Maladies des Vieillards ... Avec la collaboration de S. Bonnamour.* Paris, Doin, 1912.
81. Lorand, Arnold. *La Vieillesse* ... Paris, Baillière, 1914.
    Arnold Lorand is medical consultant at Carlsbad.
82. Scott, Thomas Bodley. The Endocrines in the Treatment of Premature Old Age.
    Reprinted from: *New York Medical Journal,* 115:431-433, 1922.
83. Scott, Thomas Bodley. *The Road to a Healthy Old Age* ... New York, Hoeber, 1914.
84. Scott, Thomas Bodley. *The Road to a Healthy Old Age.* London, Unwin, 1917.
85. Thompson, William Gilman. Centenarians and Nonagenarians.
    Reprinted from: *Medical Record,* 83:277-280, 1913.
    William Gilman Thompson (1856-1927) was professor of medicine at Cornell University Medical College 1898-1916. He devoted much time and thought to the constitution, management and educational value of hospitals. He was a trustee of the Academy, 1909-1924. His contributions to literature covered a wide range of clinical subjects. He died in New York City, October, 1927.
86. Nascher, Ignatz Leo. *Geriatrics* ... Philadelphia, Blakiston, 1914.
87. Nascher, Ignatz Leo. A Plea for the Study of Geriatrics.
    Reprinted from: *Medical Record,* 78: 536-538, 1910.
88. Nascher, Ignatz Leo. The Neglect of the Aged.
    Reprinted from: *Medical Record,* 86: 457-460, 1914.
89. Nascher, Ignatz Leo. Some Geriatric Aphorisms.
    Reprinted from: *American Medicine,* n.s. 9: 723-726, 1914.

BOOKS FROM 1914 TO PRESENT DAY

90. Bell, Alexander Graham. *The Duration of Life and Conditions Associated with Longevity.* Washington, Genealogical Record Office, 1918.
    Alexander Graham Bell (1847-1922), inventor of the telephone and photophone, was apparently much interested in the problems of old age, for he wrote several articles upon them.
91. Voronoff, Serge. *Vivre. Etude des Moyens de Relever L'Energie Vitale* ... Paris, Bernard Grasset, 1920.
    On the 8th of October, 1919, before the 28th French Congress of Surgery, Voronoff announced his rejuvenation experiments by gland transplantation. There was much enthusiasm and his notoriety at once became worldwide. He is now Director of the Laboratory of Biology of Ecole des Hautes Etudes in Paris.

92. Voronoff, Serge. *The Conquest of Life. Translated by G. Gibier Rambaud.* New York, Brentano, 1928.

93. Voronoff, Serge. *The Study of Old Age and My Method of Rejuvenation. Translated by Fred. F. Imianitoff.* London, Gill Publishing Co., 1926.

94. Thewlis, Malford W. *Geriatrics* ... St. Louis, Mosby, 1919.

95. Thewlis, Malford W. Geriatrics as a Special Branch of Medicine. Reprinted from: *Medical Journal and Record,* 119:304-305, 1924.

96. Pryke, Sir William, Orpen, Sir William, O'Connor, T. P., and others. *How to Live Long.* London, Hutchinson, [1926].

97. Lacassagne, Alexandre. *A Green Old Age. Translated by Herbert Wilson.* London, Bale, 1923.

98. Bardwell, Francis. *The Adventure of Old Age.* Boston, Houghton, 1926.

99. Pearl, Raymond. *Alcohol and Longevity.* New York, Knopf, 1926.

100. Goizet, Louis Henri. *Never Grow Old* ... New York, Putnam, 1920.

101. MacCabe, F. F. *Human Life and How it May be Prolonged to 120 Years.* London, Grant Richards, 1919.

102. Holmes, S. J. Age at Parenthood, Order of Birth, and Parental Longevity in Relation to the Longevity of Offspring. *University of California Publications in Zoology.* 31:359-375, 1928.

103. A special number devoted to age and disease. *Practitioner,* 115: 1-96, 1925.

104. Rolleston, Sir Humphry Davy. Concerning Old Age.
Read at: The Royal Institution of Great Britain, weekly meeting, Friday, May 13, 1927. *Nature* (London), 120: Supp. 2-12, 1927.

105. Rolleston, Sir Humphry Davy. *Some Medical Aspects of Old Age.* London, Macmillan, 1922.
Sir Humphry Rolleston (1862-), formerly President of the Royal College of Physicians, 1922-26, was made Regius Professor of Physic, University of Cambridge in 1925.

OLD AGE IN POETRY AND LAY PROSE

106. Card inscribed: Chinese Medical Sayings and Proverbs.
Taken from: *Reports* of the North Manchurian Plague Prevention Service, 5: 300-315, 1925-1926. Quotations, numbers 45, 144, 190, 208, 212, 230, 231, 270, 271, 272.

107. Cards Inscribed: Quotations from the Poets.
Taken from: Hoyt, J. K. *The Cyclopedia of Practical Quotations.* New York, Funk & Wagnalls, 1896, pp. 8-12.
Quotations are those dealing with old age from Beranger, Byron, O. W. Holmes, Longfellow, Milton, Shakespeare, Swift.

108. Card quoting verse from: *The Bible,* Psalm XC—verse 10.

109. Card quoting verses from: *The Bible,* Psalm CIII—verses 15 and 16.

110. *The Bible.* Ecclesiastes, Chap. XII.
This chapter is always mentioned in any discussion of the course of human life. It is also one of the cryptic chapters.

111. Mead, Richard. *Medica Sacra* ... London, Brindley, 1755, pp. 38-56.
This chapter is a commentary on Ecclesiastes Chap. XII. Many others have puzzled over the meaning of verses 3 and 6.

112. The Old Man and Death.
In: *Fables of Aesop and Others* ... London, J. Tonson, 1722. Fable LXVI.
This is the so-called Croxall edition which was very popular during the 18th century.
(Lent by Dr. E. J. Rhodebeck)

113. "Of Old Age".
In: Petrarch (Petrarca) Francesco. *Phisicke Against Fortune ... Englished by Thomas Twyne.* London, Richard Watkyns, 1579, p. 262. 83rd Dialogue.
These dialogues were written by Petrarch, the greatest of the Italian sonnetteers, as bucklers against both fortune and adversity.
(Kindly given by Mrs. Walter B. James)

114. Passages dealing with longevity.
In: Torquemeda, Anthonio. *The Spanish Mandeville of Miracles* ... London, I. R., 1600, fol. 24.
This is a curious book of tales, legends and popular beliefs.
(Lent by Dr. E. J. Rhodebeck)

115. Character of "An Olde Man" described.
In: Overbury, Sir Thomas. *His Wife. With additions of new newes and divers more characters* ... London, Edward Griffin, 1618, Sig. D4.
Sir Thomas Overbury was particularly known in his day for his poem, "A Wife" and for his delineations of various common characters. He became involved in a court intrigue and was poisoned while a prisoner in the Tower.
(Lent by Dr. E. J. Rhodebeck)

116. Essay "Of Youth and Age".
In: Bacon, Francis. *The Essays or Counsels Civill and Morall* ... London, John Beale, 1639, p. 247.
Francis Bacon (1561-1626), courtier, statesman and founder of experimental philosophy, is perhaps best known by his book of essays, of which this, on youth and age, is a good example.
(Lent by Dr. E. J. Rhodebeck)

117. Extracts concerning old age from the British dramatic poets before the year 1655.
In: Cotgrave, John. *The English Treasury of Wit and Language*

...London, Humphrey Mosley, 1655, p. 205.
(Lent by Dr. E. J. Rhodebeck)

118. A passage, "Old Age, a Cause of Melancholy".
In: Burton, Robert. *The Anatomy of Melancholy ... By Democritus Junior.* Oxford, John Lichfield, 1621, pp. 78-79.
First edition of probably the best medical book ever written by a layman.
(Lent by Dr. E. J. Rhodebeck)

119. Poem called "Crabbed Age and Youth", attributed to William Shakespeare.
In: *The Oxford Book of English Verse ... ed. by Arthur Quiller-Couch.* Oxford, Clarendon Press, 1919, p. 86, No. 56.
(Lent by the Librarian)

120. Passages dealing with old age.
In: Erasmus, Desiderius. *Moriae Encomium: or, A Panegyrick upon Folly.* London, J. Woodward, 1709, pp. 14-15.
(Lent by Dr. E. J. Rhodebeck)

121. Jaques' interpretation of the seven ages of man in Shakespeare's play, "As You Like It", Act II, Scene VII.
In: Shakespeare, William. *Complete Works. Edited ... by W. J. Craig.* London, Oxford University Press, n.d., p. 260.
(Lent by the Librarian)

122. Essay of "Old Age".
In: Montaigne, Michael. *Essays. Translated by Charles Cotton ... Edited by William Carew Hazlitt.* London, Navarre Society, 1923, ii. p. 227.
Contains the well known line, "If I must be dragged into Old Age, it will be backwards."
(Lent by Dr. E. J. Rhodebeck)

123. "To Age", a poem by Walter Savage Landor.
In: *A Physician's Anthology of English and American Poetry, selected and arranged by Casey A. Wood and Fielding H. Garrison.* London, Oxford University Press, 1920.

124. Card bearing the poem, "Up-Hill", Christina Georgina Rosetti's comment on the path of life.
From: Palgrave, Francis Turner. *Golden Treasury of the Best Songs and Lyrical Poems in the English Language.* London, Oxford University Press, [1916], pp. 451-452, poem No. 383.

125. Poem bearing title, "His Recipe for Longevity", by Alfred Earle, Bishop of Marlborough.
In: Sayle, Charles. *The Ages of Man.* London, Murray, 1916. p. 109, No. 85.
Also contains a number of quotations dealing with old age from authors in the past and from the sacred books of the east.

126. Poem entitled, "The Last Leaf", a fine picture of old age.
In: Holmes, Oliver Wendell. *Complete Poetical Works.* Boston, Houghton, [1895], pp. 4-5.

127. Stanza describing the onset of old age from Oliver Wendell Holmes' poem, "The One Hoss Shay".
In: Holmes, Oliver Wendell. *The One Hoss Shay* ... Boston, Houghton, 1892, p. 23.
This poem has been used to present a picture of a normal old age and resulting bodily dissolution.

128. Lines, "It ran a hundred years to a day,
And then, of a sudden, it—ah, but stay". From the poem, "The One-Hoss Shay".
In: Holmes, Oliver Wendell. *The Autocrat of the Breakfast Table* ... Boston, Houghton, 1892, p. 253.
What could be a better description of normal old age than these lines?

129. Swinburne's "Ballad of Burdens" showing the stanza, "The burden of long living".
In: Swinburne, Algernon Charles. *Poems and Ballads.* London, Moxon, 1866, p. 145.
This is the first edition.
(Lent by Dr. E. J. Rhodebeck)

130. Robert Southey's poem, "The Happy Old Age", which was the inspiration for Lewis Carroll's verses concerning Father William.
In: Mylius, William Frederick. *The Poetical Class Book: or, Reading Lessons for Every Day in the Year* ... London, Godwin, 1814, pp. 140-141.
This book was actually compiled by Charles and Mary Lamb as a class book for children.
(Lent by Dr. E. J. Rhodebeck)

131. Poem, "You are old Father William".
In: Carroll, Lewis. *Alice's Adventures in Wonderland.* London, Macmillan, 1866.
This is the edition known as the first although there was a printing the previous year which was never distributed because of poor impressions of the plates.
(Lent by Dr. E. J. Rhodebeck)

ILLUSTRATIONS OF OLD AGE

132. Reproduction of the Portrait of an Old Man, by Ribera.
In: *Catalogue of an Exhibition of Spanish Paintings* ... New York, Metropolitan Museum of Art, 1928.

133. One of the famous drawings of Leonardo da Vinci (1452-1519).
In: Sirén, Osvald. *Leonardo da Vinci, The Artist and the Man.* New Haven, Yale University Press, 1916, facing p. 90.
The drawing shows four distinct facial types in the aged.

134. Reproduction of a Portrait of Katherine, Countess of Desmond, reputed to have lived to 140 years.
In: Rolleston, Sir Humphry Davy. *Some Medicial Aspects of Old Age.* London, Macmillan, 1922.

135. Reproduction of a Portrait of Henry Jenkins, reputed to have lived to 169 years.
In: Rolleston, Sir Humphry Davy. *Some Medical Aspects of Old Age.* London, Macmillan, 1922.

136. Account of the post mortem examination of the body of Thomas Parr, which was made by William Harvey.
In: Harvey, William. *An Anatomical Disquisition on the Motion of the Heart and Blood in Animals.* London, Dent, [1906], pp. 207-211.
Harvey decided that Parr died of a suffocation due to the impure air of London after having lived all his life in the country.

137. Reproduction of a Portrait of Thomas Parr.
In: Rolleston, Sir Humphry Davy. *Some Medical Aspects of Old Age.* London, Macmillan, 1922.
Thomas Parr is reputed to have died at the age of 152 years.

138. Reproduction of a Portrait of Harry Morgan at the age of 105 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)

139. Reproduction of a Portrait of Donald McLeod at the age of 102 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)

140. Reproduction of a Portrait of Mother George at the age of 120 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)
Mother George, who lived to the age of 120 years, resided in the Parish of Saint Peter's in Baily at Oxford. She retained the use of all her faculties and was much resorted to by company from motives of curiosity. She was wont to thread a fine needle as proof of the excellence of her eyesight. She died from the effect of a fall.

141. Reproduction of a Portrait of Peter Garden who died at the reputed age of 131 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)

142. Reproduction of a Portrait of Isobel Walker who died at the reputed age of 112 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)

143. Reproduction of a Portrait of Jane Scrimshaw at the reputed age of 126 years.
In: A Scrapbook of Remarkable Characters.
(Kindly lent by the Grolier Club)

144. Reproduction of a Portrait of Old Scaleits, sexton of Peterboro, at the age of 98 years.

In: A Scrapbook of Remarkable Characters.

(Kindly lent by the Grolier Club)

This has the curious legend as follows:

"You see old Scaleits picture stand on hie
But at your feet there doth his body lye.
His gravestone doth his age and death time show
His office by theis tokens you may know.
Second to none for strength and sturdye limm
A scarbabe mighty voice with visage grim.
He had interd two queens within this place
And this towns householders in his lives space
Twice over: but at length his one turn came
What he for others did for him the same
Was done no doubt his soul doth live for aye
In Heaven: though here his body clad in clay

July 2, 1594 R.S. aetatis 98".

145. Reproduction of a Portrait of Dr. Stephen Smith made for his 95th anniversary at the Battle Creek Sanitarium, 1918.

Bears autographed inscription.

Stephen Smith (1823-1922), pioneer public health officer, well known surgeon and member of The New York Academy of Medicine. He was professor of surgery and of anatomy at the Bellevue Medical School and professor of clinical surgery in the New York University Medical School. He was father of the Metropolitan Health Bill, created the American Public Health Association and initiated sundry reforms in hospital service and medical education. His writings were many and varied, the best known being "The City that Was" and his "Principles and Practice of Operative Surgery". He died August 26, 1922, just six months short of his hundredth birthday.

146. Reproduction of photographs of Stephen Smith at the ages of 25 and 95 years.

In: *Medical Life*, 35: 290, 1928.

147. Chapter dealing with unusual cases of longevity.

In: Gould, George M., and Pyle, Walter L. *Anomalies and Curiosities of Medicine* ... Philadelphia, Saunders, 1900, pp. 365-382.

148. Reproduction of a photograph of an example of progeria or premature old age.

In: Gilford, Hastings. On a Condition of Mixed Premature and Immature Development.

In: *Medico-Chirurgical Transactions* ... 80: 17-47, 1897, plate X

149. Depew, Chauncey M. No More Old Men.
In: *New York Times,* November 17, 1916.
Report of an address before The New York Academy of Medicine.

150. Report of a Chinese who was reported to have recently celebrated his 250th birthday.
In: *The Times,* weekly edition, London, August 23, 1928.

151. Card Inscribed: Thomas Alva Edison (1847-), foremost American inventor, is 81 years of age and is still actively engaged in research.

152. Photograph of Thomas Alva Edison at the age of three.
(Kindly lent by Thomas Alva Edison)

153. Photograph of Thomas Alva Edison at the age of thirty-one.
(Kindly lent by Thomas Alva Edison)

154. Photograph of Thomas Alva Edison at the age of thirty-five.
(Kindly lent by Thomas Alva Edison)

155. Photograph of Thomas Alva Edison at about fifty years of age.
(Kindly lent by Thomas Alva Edison)

156. Photograph of Thomas Alva Edison at the age of sixty-four, with a group of workers.
This group was facetiously known as "The Insomnia Squad", because it worked night and day for six weeks.
(Kindly lent by Thomas Alva Edison)

157. Photograph of Thomas Alva Edison at a banquet given in his honor on his seventieth birthday.
(Kindly lent by Thomas Alva Edison)

158. Photograph of Thomas Alva Edison at the age of eighty.
(Kindly lent by Thomas Alva Edison)

159. Familial Longevity. Mrs. Mary Maidment celebrated her 102nd birthday on October 11. She belongs to the third centenarian generation, her mother living to 104 and her maternal grandfather to 100.
In: *Lancet,* 2: 801, 1928.

RECENT ACCESSIONS TO THE LIBRARY

Adler, A. Praxis und Theorie der Individualpsychologie...
3. Aufl., München, Bergmann, 1927, 257 p.

de Beer, G. R. Vertebrate zoology.
London, Sidgwick, 1928, 505 p.

Bing, R. Kompendium der topischen Gehirn-und Rückenmarksdiagnostik.
7. Aufl., Berlin, Urban, 1927, 259 p.

Boeminghaus, H. Urologische Diagnostik und Therapie...
Jena, Fischer, 1927, 247 p.

Brandt, R. & Szandicz, S. Die serologischen Reaktionen der Syphilis.
Berlin, Urban, 1928, 90 p.

Brown, G. E. & Allen, E. V. Thrombo-angiitis obliterans.
Phil., Saunders, 1928, 219 p.

Caven, R. M. & Cranston, J. A. Symbols and formulae in chemistry...
London, Blackie, 1928, 220 p.

Cemach, A. J. Surgical diagnosis in tabular outline...
Phil., Davis, 1928, 82 pl. 84 tab.

Chapin, H. D. & Royster, L. T. Diseases of infants and children.
6. ed., N. Y., Wood, 1928, 675 p.

Chesser, E. S. Youth. A book for two generations...
N. Y., Dutton, [1928], 112 p.

Darling, H. C. R. Surgical nursing and after-treatment.
3. ed., London, Churchill, 1928, 626 p.

Emerson, C. P. Essentials of medicine.
8. ed., Phil., Lippincott, [1928], 588 p.

European clinics... 1927.
Phil., Lippincott, 1928, 347 p.

Faure, J. L. & Siredy, A. Traité de gynécologie médico-chirurgicale.
4. éd., Paris, Doin, 1928, 1319 p.

Finger, C. J. David Livingstone, explorer and prophet.
London, Allen, [1927], 300 p.

Garrè, C. & Borchard, A. Lehrbuch der Chirurgie.
6. Aufl., Leipzig, Vogel, 1928, 752 p.

Gohrbrandt, E., Karger, P. & Bergmann, E. Chirurgische Krankheiten im Kindesalter.
Berlin, Karger, 1928, 916 p.

Gibson, C. R. Modern conceptions of electricity.
London, Seeley, 1928, 283 p.

Groves, E. R. The marriage crisis.
N. Y., Longmans, 1928, 242 p.

Gruber, G. Die Welt der kleinsten Lebewesen.
Berlin, Ullstein, [1927], 130 p.

Gruenberg, S. M. Your child, today and tomorrow.
3. ed., Phil., Lippincott, 1928, 255 p.

Hanström, B. Vergleichende Anatomie des Nervensystems der wirbellosen Tiere...
Berlin, Springer, 1928, 628 p.

Harry, G. The Peltzer case.
London, Bles, [1928], 243 p.

Heinz, W. Tagebuch eines alten Irrenarztes.
Lindenthal, Wellersberg, 1928, 75 p.

Hertzler, A. E. The technic of local anesthesia.
4. ed., St. Louis, Mosby, 1928, 284 p.

Horder, (Sir) T. & Gow, A. E. The essentials of medical diagnosis.
London, Cassell, 1928, 682 p.

Hose, R. E. Prohibition or control?
N. Y., Longmans, 1928, 132 p.

Hugon, P. D. Our minds and our motives.
N. Y., Putnam, 1928, 475 p.

Janke, A. & Zikes, H. Arbeitsmethoden der Mikrobiologie.
Dresden, Steinkopff, 1928, 183 p.

Juilly, G. H. Practical surgery of the abdomen.
Phil., Davis, 1928, 2 v.

Kahn, R. L. The Kahn test. A practical guide.
Balt., Williams, 1928, 201 p.

Kaye, G. W. C. Roentgenology.
N. Y., Hoeber, [1928], 157 p.

Keith, (Sir) A. Darwinism and what it implies.
London, Watts, 1928, 56 p.

Kollmann, J. Plastische Anatomie des menschlichen Körpers...
Berlin, de Gruyter, 1928, 624 p.

Kurtzahn, H. Chirurgische Röntgenologie.
Berlin, Urban, 1927, 216 p.

Landrau.
London, Bles, [1928], 244 p.

Lectures on plant pathology and physiology in relation to man.
Phil., Saunders, [1928], 207 p.

Leriche, R. & Policard, A. The normal and pathological physiology of bone.
St. Louis, Mosby, 1928, 236 p.

Long, E. R. A history of pathology.
Balt., Williams, 1928, 291 p.

Manson, J. S. Observations on human heredity.
London, Lewis, 1928, 84 p.

Martin, R. Lehrbuch der Anthropologie...
2. Aufl., Jena, Fischer, 3 v.

Mead, S. V. Diseases of the mouth.
3. ed., St. Louis, Mosby, 1928, 727 p.

Methodik der wissenschaftlichen Biologie. Hrsg. von T. Péterfi.
Berlin, Springer, 1928, 2 v.

Mysterious (The) murder of Maria Marten at Polstead, in Suffolk.
London, Bles, [1928], 300 p.

Osborn, H. F. Men of the old stone age...
3. ed., N. Y., Scribner, 1928, 559 p.

Pauchet, V. & Dupret, S. Pocket atlas of anatomy.
London, Milford, 1928, 306 p.

Ponzio, M. Gli elementi fisici e biologici della radioterapia.
Torino, Unione tip., 1927, 519 p.

Pottenger, F. M. Tuberculosis and how to combat it.
2. ed., St. Louis, Mosby, 1928, 275 p.

Précis de pathologie chirurgicale.
5. éd., Paris, Masson, 1928, 6 v.

Ramón y Cajal, S. Degeneration & regeneration of the nervous system.
London, Milford, 1928, 2 v.

Rhode, J. The case of Constance Kent.
London, Bles, [1928], 278 p.

Richet, C. The impotence of man.
London, Laurie, [1928], 149 p.

Ringleb, O. Lehrbuch der Kystoskopie.
München, Bergmann, 1927, 333 p.

Schmorl, G. Die pathologisch-histologischen Untersuchungsmethoden.
15. Aufl., Leipzig, Vogel, 1928, 495 p.

Schönbauer, L. Konservative Frakturenbehandlung.
Wien, Springer, 1928, 216 p.

Schottlaender, F. Erwin von Baelz.
Stuttgart, Ausland und Heimat Verlag, 1928, 163 p.

Service, R. W. Why not grow young?
London, Benn, [1928], 224 p.

Siegrist, A. Der graue Altersstar...
Berlin, Urban, 1928, 399 p.

Stall, S. What a young man ought to know.
Rev. ed., Phil., Vir, [1928], 170 p.

Stedman, T. L. A practical medical dictionary.
10. ed., N. Y., Wood, 1928, 1194 p.

Stierlin, E. Klinische Röntgendiagnostik des Verdauungskanals.
2. Aufl., Berlin, Springer, 1928, 642 p.

Strahlenbehandlung (Die) gut- und bösartiger Geschwülste...Hrsg. von Fritz Heimann.
Berlin, Stilke, 1928, 630 p.

Thompson, C. J. S. The quacks of old London.
London, Brentano, [1928], 356 p.

Trial (The) of Harry Thaw.
London, Bles, [1928], 300 p.

Trial (The) of Patrick Mahon.
London, Bles, [1928?], 286 p.

Trial (The) of Prof. John White Webster.
London, Bles, [1928], 275 p.

Trial (The) of the detectives.
London, Bles, [1928], 302 p.

Volkskunde (Die) und ihre Beziehungen zu Recht, Medizin, Vorgeschichte...
Berlin, Stubenrauch, 1928, 64 p.

Wall, O. A. Handbook of pharmacognosy.
5. ed., revised by L. Suppan.
St. Louis, Mosby, 1928, 472 p.

Ward, H. Charles Darwin. The man and his warfare.
London, Murray, [1927], 472 p.

Watson, J. B. & McDougall, W. The battle of behaviorism.
London, Paul, 1928, 103 p.

Williams-Ellis, A. How you began. A child's introduction to biology.
London, Howe, [1928], 95 p.

Wilson, S. A. K. Modern problems in neurology.
London, Arnold, 1928, 364 p.

Wlassak, R. Grundriss der Alkoholfrage.
2. Aufl., Leipzig, Hirzel, 1929, 255 p.

Wood-Allen, M. What a young woman ought to know.
New ed., Phil., Vir, [1928], 272 p.

Ziegner, H. Vademekum der speziellen Chirurgie und Orthopädie für Aerzte.
9. Aufl., Leipzig, Vogel, 1928, 326 p.

PROCEEDINGS OF ACADEMY MEETINGS

DECEMBER

Stated Meetings

Thursday Evening, December 6, at 8:30 o'clock

Program presented in cooperation with the Section of Dermatology and Syphilis

ORDER

I. Executive Session
Election of Officers

II. Papers of the Evening
Allergy in Dermatology
a. The skin as a shock tissue, Arthur F. Coca
b. Clinical aspects of allergy in skin diceases, Sigmund Pollitzer; discussion, Abraham Walzer, Charles Mallory Williams

Thursday Evening, December 13, at 8:30 o'clock

The Third Harvey Lecture

Metallotherapy of the spirochaetoses, C. Levaditi, Professor of Microbiology, Institut Pasteur, Paris; Peyton Rous, President, Harvey Society; Philip D. McMaster, Secretary, Harvey Society.

This lecture takes the place of the second Stated Meeting of the Academy for December

Section Meetings

Section of Dermatology and Syphilis

Tuesday Evening, December 4, at 7:45 o'clock

ORDER

I. Presentation of Patients
   a. Cases from the Vanderbilt Clinic, J. Gardner Hopkins, A. Benson Cannon, George C. Andrews, Lawrence K. McCafferty, Herman Feit, Paul Gross, Herman Sharlit, Lewis B. Robinson
   b. Miscellaneous Cases

II. Discussion

III. Executive Session

Attention is called to the Stated Meeting of the Academy on December 6. Examination of cases is limited to members and their invited guests Kindly note change in hour.

Section of Surgery

Friday Evening, December 7, at 8:30 o clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   a. Bilateral modified Pirogoff amputation, Joseph E. J. King
   b. Cases of fractures of clavicle illustrating paper of the evening, Charles W. Lester
   c. Cases of fractures of the neck of the femur illustrating paper of the evening, Paul Crenshaw Colonna

III. Papers of the Evening
   a. Fractures of the clavicle with special reference to the treatment, Charles W. Lester
   b. Fracture of the neck of the femur in childhood, Paul Crenshaw Colonna

IV. General Discussion

V. Executive Session

Section of Neurology and Psychiatry

Tuesday Evening, December 11, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Pathological Presentation
   A case of pseudo-bulbar paralysis with unusual pathologic findings (lantern slides), Lewis D. Stevenson

III. Papers of the Evening
   a. The convulsive state and the results obtained by limitation of fluids, Temple Fay, Philadelphia (by invitation); discussion, Charles A. Elsberg, Foster Kennedy, Israel Strauss
   b. Segmental hyperalgesia and segmental increased muscle tone in

disease of the lungs and heart, Jesse G. M. Bullowa; discussion, S. Philip Goodhart, Walter M. Kraus.

Section of Pediatrics

Thursday Evening, December 13, at 8:30 o'clock

ORDER

I. Paper of the Evening

The development diagnosis of behavior in infancy and its significance for clinical pediatrics. Stereopticon and motion pictures, Arnold Gesell, Director, Yale Psycho Clinic (by invitation); discussion, Sanger Brown, 2nd, Lawson G. Lowrey (by invitation), Helen Wooley, Ph.D. (by invitation).

Section of Otology

Friday Evening, December 14, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases

III. Papers of the Evening

a. Notes on the surgery of acute labyrinthitis, Ralph Almour

b. Early operative treatment of otitic meningitis, with case reports, Samuel J. Kopetzky; discussion, Wells P. Eagleton, E. D. Friedman

IV. General Discussion

V. Executive Session

Section of Ophthalmology

ORDER

I. Reading of the Minutes

II. Clinical Cases

a. Circumcorneal papilloma, William B. Doherty

b. Intracranial cyst with double choked disc in child; operation and recovery, Raymond C. Dodd

c. (1) Monocular diplopia, bilateral, the result of chronic encephalitis (2) Unusual corneal pigmentation (Fleischer's ring) in hepatolenticular degeneration, Daniel L. Poe (by invitation)

III. Demonstration

Ten microscopical slides of intraocular diseases, Melvin G. Herzfeld (by invitation)

V. Papers of the Evening

a. Radium therapy in diseases of the eye and adnexa, with presentation of patients, G. Allen Robinson

b. The new intracapsular operation, being gist of recent experience abroad with Col. Henry Smith and Prof. E. Kalt, Charles B. Meding

V. Executive Session

Section of Medicine

Tuesday Evening, December 18, at 8:30 o'clock

ORDER

I. Papers of the Evening
   a. The circulatory response to hyperthyroidism and myxedema, Herman Blumgart, Harvard Medical School (by invitation)
   b. What are the objects of digitalis therapy? Harold J. Stewart (by invitation)
   c. A study of obesity, circulatory, x-ray and electrocardiograph investigations, Arthur M. Master

II. Discussion, Alfred E. Cohn, Robert L. Levy

Section of Obstetrics and Gynecology

Tuesday Evening, December 18, at 8:30 o'clock

Kindly note change in date

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   a. An unusual traumatic gynecological case, Emil Albin Rundquist (by invitation); discussion, George L. Brodhead, Harry Aranow
   b. A case of traumatic evisceration, Salvatore di Palma; discussion, David N. Barrows, Gerald L. Moench.
   b. A case of traumatic evisceration, Salvatore di Palma

III. Papers of the Evening
   a. Vaginal examination in the third stage of labor as a guide to its management. A report of one thousand cases, Morris Leff (by invitation); discussion, Harry Aranow, George L. Brodhead, William Edgar Caldwell, William H. Carey (by invitation), Everett M. Hawks, Maurice O. Magid.
   b. The treatment of retro-displacements of the uterus, John Cooke Hirst (by invitation); discussion, Ralph A. Hurd, Henry C. Falk

IV. General Discussion

V. Executive Session

Section of Genito-Urinary Surgery

Wednesday Evening, December 19, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   a. A new needle holder, Abraham Ravich (by invitation)
   b. Epithelioma of penis—specimen, George A. Wyeth
   c. Unusual foreign body with vesical calculus, Clarence G. Bandler

III. Papers of the Evening
   a. Etiology and pathology of vesico-renal reflux, Robert Gutierrez (by invitation); discussion, Oswald S. Lowsley

b. Anomalies of the upper urinary tract (with lantern slides), Nathaniel P. Rathbun; discussion, H. J. Bagg, M. Campbell, E. F. Du Bois, Thomas J. Kirwin

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, December 21, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES
a. Idiopathic decalcification of spine, Barclay W. Moffatt
b. I. Operation for heredity weak feet; 2. Paralytic dislocation of hip, William H. Irish; 3. Potts disease-treated conservatively
c. Cases illustrating paper of the evening, Samuel W. Boorstein

III. PAPERS OF THE EVENING
Fractures of true pelvic ring with a report of one hundred cases at Fordham Hospital (lantern slides), Samuel W. Boorstein

IV. DISCUSSION, Harry Finkelstein, George F. Cahill, Abraham J. Rongy

V. GENERAL DISCUSSION

SECTION OF LARYNGOLOGY AND RHINOLOGY

Wednesday Evening, December 26, at 8:00 o'clock

Kindly note change of hour

Bellevue, St. Vincent's and Lenox Hill Hospitals

Night

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES
a. Osteoma of frontal sinus
b. Frontal lobe abscess
c. Osteomyelitis of frontal bone
d. Frontal sinusitis with epidural abscess, Richard T. Atkins
e. Cyst of ethmoid region (Killian), G. F. Oberrender (by invitation)
f. Laryngectomy, James W. Babcock
g. Two cases of thyrotomy for retained tracheotomy tube; second presentation, John D. Kernan

III. REPORT OF CASE
Relationship of polypoid ethmoiditis to asthma, John M. Loré

IV. DEMONSTRATION
Intra-tracheal anaesthesia and new method of resuscitation (motion pictures), Paluel Joseph Flagg (by invitation)

The Pre-Meeting Dinner will be held at the Academy at 6:45 o'clock

NOTICE

There will be no meeting of the Section of Historical and Cultural Medicine on the regular meeting date, Friday, December 28. The next meeting of the Section will be held on January 11, 1929, and will be announced later.

Dates of Academy Meetings

STATED MEETINGS

1st and 3rd Thursdays.

SECTION MEETINGS

Dermatology and Syphilis, 1st Tuesday.
Surgery, 1st Friday.
Neurology and Psychiatry, 2nd Tuesday.
Pediatrics, 2nd Thursday.
Otology, 2nd Friday.
Ophthalmology, 3rd Monday.
Medicine, 3rd Tuesday.
Genito-Urinary Surgery, 3rd Wednesday.
Orthopedic Surgery, 3rd Friday.
Obstetrics and Gynecology, 4th Tuesday.
Laryngology and Rhinology, 4th Wednesday.
Historical and Cultural Medicine, 2nd Wednesday of November, January, March and May.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

Trustees, 4th Wednesday.
Council, 4th Wednesday.
Committee on Admission, 1st Wednesday.
Committee on Library, 2nd Tuesday.
Public Health Relations Committee, Mondays.
Committee on Medical Education, 2nd Thursday.
Committee on International Medical Relations, 3rd Wednesday.

Luncheon Announcement

A simple luncheon is now being served on the sixth floor to the Academy staff.

The House Committee has agreed to have luncheons served in the reception room to Fellows of the Academy. Any Fellow desiring luncheon should notify the Academy telephone operator not later than 11 A. M.

Donations to the Library Funds

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of $5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

Death Notice

William Pfeiffer, M.D., 839 Prospect Place, Brooklyn, New York; graduated in medicine from Cornell University Medical College, New York City, in 1903; elected a Fellow of the Academy May 4, 1922. He was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the American Association of Obstetricians and Gynecologists, and Abdominal Surgeons, a member of the Pathological Society, a member of the Gynecological Society, a member of the New York Obstetrical Society, Obstetrician and Gynecologist to Kings County and Holy Family Hospitals. Obstetrician-in-Chief to Beth Moses Hospital and Obstetrician to Peck Memorial Hospital. Dr. Pfeiffer died December 8, 1928.

Index

The index for the year 1928 is in press and will be mailed in the near future.